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Detroit: Suburbs and City

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SECTOR THEORY

The sector theory of residential neighborhoods, initially espoused by the economist Homer Hoyt and based on empirical research in the 1930s, states that in large urban areas different socioeconomic groups tend to reside in distinct sectors, each a collection of adjacent municipalities or neighborhoods sharing a major transportation corridor. Following the old maxim that "birds of a feather flock together," high-income families reside in upper-class sectors, often distinguished by beautiful topological features such as scenic hills and pleasant, safe lakefront locations. Such sectors are frequently located toward areas where the wealthy have traditionally resided and are usually situated on the outer fringe of an urban area, well removed from the noise and congestion found in an urban area's core or central business district. Excluded from the choicest residential areas due to their inadequate purchasing power, middle- and low-income families aggregate into their own unique sections. Middle-income families form middle-class sectors bordering the upper-class sectors. Low-income families reside in lower-class sectors, which contain the area's oldest stock of basic housing and a number of factories providing employment to this sector's wage earners.

Like the "big bang" theory of the universe, the sectors are continuously retreating from the core of the urban area, guided by major transportation corridors. High-income families eventually desire new, improved housing, and these houses will be built on open land surrounding the urban area. The houses vacated by these families will be acquired by middle-income families, who also desire to improve their housing situation by moving to relatively newer housing. Low-income families, who previously resided in the oldest stock of housing, will now obtain the housing vacated by the middle-income families and thus also improve their housing status. As a result of this process, the central core of the urban area is dotted with vacant houses and lots, a condition called urban blight. This movement is better known as residential or neighborhood filtering in urban economics literature. Successfully predicting the eventual movement of each category of sectors is a key objective of real estate developers, mortgage and commercial real estate loan officers, urban planners, and city development economists.

The economic future of the Detroit Standard Metropolitan Statistical Area (SMSA) and of Detroit as its central city is directly dependent on the movement of the residential sectors in suburban Detroit. Of crucial importance is the movement of the upper-class suburban sectors. Because of the concept of residential filtering, their movements primarily determine the physical expansion of the Detroit urban area.

All data in this article, unless otherwise noted, were obtained through appropriate censuses of population, housing, manufacture,

For forecast update on the OUTLOOK FOR THE
OUTSTATE SMSAs see page 8.

and retail trade and *Southeast Michigan Community Profiles, 1980 Census*. The latter is a report compiled by the City of Detroit Planning Department, the Michigan Metropolitan Information Center/Center for Urban Studies at Wayne State University and the Southeastern Michigan Council of Governments.

SUBURBAN SECTORS

Eighteen suburban Detroit residential sectors were identified by locating major suburban municipalities which have relatively equivalent median values of owner-occupied residences and share the same major transportation corridor originating from downtown Detroit, where many wage earners in all suburban sectors are

employed. Value of residence is a direct and visible indication of family income. These sectors were further classified as either upper-class, upper or lower middle-class or lower-class on the basis of the sector's relative home value ratio. The latter is a weighted average of the relative home value ratios of each sector's major municipalities. This ratio for a specific municipality is the median value of owner-occupied residences in the municipality divided by the median value of owner-occupied residences in the Detroit SMSA. This allows for the negation of inflation's effects on rising house values. Rather, the relative home value ratio indicates that houses in a specific municipality have increased in value in comparison with other houses in the Detroit SMSA only if this

Suburban Detroit Residential Sectors

Sector number	Major municipalities in sector	Sector relative home value ratio	Year structure built (% of all residential units)		Percentage of employed sector residents in occupations of		
			1970-Mar. 1980	pre-1940	Managers and professionals	Operatives, fabricators, and laborers	Manufacturing
Upper-class sectors							
1	Bloomfield Township	2.93	24	3	55	3	26
2	Northville Township	2.42	55	6	39	9	32
3	Farmington Hills	2.25	43	6	41	7	24
4	West Bloomfield Township	1.99	3	35	48	6	19
	Grosse Pointe Park						
	Grosse Pointe Farms						
5	Grosse Pointe Woods	1.93	44	8	41	9	30
	Birmingham						
	Troy						
6	Avon Township	1.79	68	3	31	15	36
	Canton Township						
	Plymouth Township						
Upper middle-class sectors							
7	Sterling Heights	1.58	51	2	25	15	37
	Shelby Township						
8	Southfield	1.58	36	3	39	7	18
9	Livonia	1.46	17	5	26	14	32
10	Clinton Township	1.34	47	3	23	16	33
Lower middle-class sectors							
11	Warren	1.11	13	6	18	20	38
12	Dearborn	1.11	10	14	21	19	34
13	Allen Park	1.00	9	15	25	15	29
	Garden City						
	Westland						
14	Royal Oak	.98	13	9	17	19	33
	Berkley						
	Madison Heights						
	East Detroit						
	St. Clair Shores						
	Roseville						
15	Oak Park	.95	3	3	18	12	20
16	Lincoln Park	.85	17	9	12	27	36
	Taylor						
Lower-class sectors							
17	Ferndale	.63	5	35	14	26	33
18	Hazel Park	.52	4	48	10	32	42
	River Rouge						
	Ecorse						
	Detroit	.49	3	46	17	25	29
	Detroit SMSA	1.00	19	24	22	20	32

ratio has increased. It is, moreover, a standard measuring the quality of life in sectors and communities.

Suburban Detroit's wealthiest sectors, 1, 2, and 3, comprised of such major municipalities as Bloomfield Township, West Bloomfield Township, Farmington Hills, and Northville Township, have features well in acceptance with tenets of the sector theory. They are situated in the scenic belt of small lakes and hills that sweeps across the northern and western portions of Oakland County and the northwest portion of Wayne County. Furthermore, the Bloomfield area has long appealed to the wealthy. Many of the leaders in the incipient automobile industry, men such as Walter Briggs, James Couzens, and Charles Wilson, had maintained large farms or estates in this area since early in the century. In addition, these sectors' housing stocks feature many new and high-quality residential units. In sectors 1-3 respectively, 24, 55, and 43 percent of all residential units were constructed between 1970 and March 1980. Only 3, 6, and 6 percent respectively of all units were constructed in 1939 or earlier. Overall for the Detroit SMSA, 19 percent of all residential units were built between 1970 and March 1980, and 24 percent were built prior to 1940.

It is the dynamic paths of the upper-class sectors, and to a lesser extent the upper middle-class sectors, that determine the expansion pattern of the Detroit urban area through the process of residential filtering. Detroit is an area one can classify as a lower-class sector with its old housing stock and relative home value ratio of .49 in 1980. Progressing along the major transportation corridors originating from Detroit, lower-class or lower middle-class suburban sectors, which have newer housing stocks than Detroit, are initially encountered. Grosse Pointe sector 4 is an exception. Next, upper middle-class or upper-class sectors, with still newer housing stocks, will be encountered. Conforming to this trend, the wealthiest sectors of Wayne, Oakland, and Macomb counties, excluding the Grosse Pointe sector, form the border of urbanized Detroit.

Throughout this process, various well-established and prosperous villages, once independent of economic activity associated with Detroit, were engulfed by the advancing upper and upper middle-class sectors. Engulfed or now being engulfed by these sectors are such communities as Birmingham, Rochester, Farmington, Plymouth, and Utica. In contrast, unattractive villages and towns, either too large to be swallowed by the advancing sectors or marked with low-income families and/or industrial activity, are bypassed by the upper- and upper middle-class sectors. These areas include Mt. Clemens, Pontiac, Royal Oak Township, and Inkster.

Indicative of residential filtering is an examination of movements in a community's relative home value ratios and the percentage of recently constructed homes in that community. Before proceeding, it must be mentioned again that sectors move along major streets or transportation arteries, "highways of invasion" as phrased by the sociologist Ernest W. Burgess.¹ During the past one hundred years the upper-class sector, situated on the Woodward Avenue/I-75 Expressway transportation corridor, has hopped on Woodward Avenue from Mack Ave-

nue in 1880, now near Detroit's central business district, to the Boston-Edison area in 1900, to Palmer Woods in the 1920s, and eventually to Birmingham-Bloomfield Township after World War II. Along the Grand River Avenue/I-696 Expressway transportation corridor, the upper-class sector advanced from the intersection of Grand River Avenue and Trumbull in 1890, which again is a location now bordering Detroit's central business district, to Rosedale Park in the 1920s and 1930s, and subsequently to Farmington Hills in the 1960s and 1970s. It must be noted that the movement of upper-class sectors is to communities on the fringe of urban Detroit and, because the high-income families desire the newest and finest quality homes in any time period, communities in upper-class sectors are marked by a high percentage of new houses. Movements of middle-class and lower-class sectors follow in the wake left by the movement of the upper-class sectors.

Troy, a community on Detroit's urban edge, is part of upper-class sector 5. During the past fifteen years it has become quite an attractive area for families in Detroit's suburbs. As its appeal increased, Troy's relative home value ratio increased from 1.52 in 1970 to 1.92 in 1980. This is a recent development; 52 percent of Troy's residential units were built between 1970 and 1980.

Troy's growth came at the expense of Royal Oak. Many of this community's residents moved to Troy in recent years. Royal Oak's housing stock is older and therefore less attractive than Troy's. Seventy-seven percent of Royal Oak's residential units were built before 1960. Residential filtering occurred as families with relatively lower incomes, as compared with previous resident families, moved to Royal Oak. Reflecting this trend, Royal Oak's relative home value ratio fell from 1.09 in 1970 to 1.05 in 1980.

Ferndale, an old suburb on the Woodward/I-75 Expressway transportation corridor, has received no benefits at all from Troy's popularity. As homes became available in Royal Oak, Ferndale's higher-income families, desiring to improve their housing status, moved to the relatively newer homes in that area. By 1980 71 percent of Ferndale's owner-occupied residences were constructed before 1950. As a consequence again of residential filtering, relatively lower-income families escaped from Detroit to Ferndale, and this situation is inherent in Ferndale's relative home value ratio declining from .85 in 1970 to .65 in 1980.

This continual process of sector movement and residential filtering is essentially occurring along all of Detroit's major transportation corridors. In addition to the Woodward Avenue/I-75 corridor, others include East Jefferson, Gratiot Avenue/I-94, Van Dyke/M-53, Grand River/I-696, Schoolcraft/I-696, Ford Road, and West Jefferson/Fort/I-75. The process will be further encouraged as wage earners in various sectors become less and less dependent on traditional employment opportunities in downtown Detroit. Since World War II the majority of new office buildings, retail shops, and factories have been constructed in the suburbs. It has been estimated that wage earners will commute up to an hour's drive; thus the increase in employment opportunities in the sub-

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Michigan Economic Indicators

Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	40.1	42.1	42.2 (Aug.)
Average weekly hours, U.S.	39.0	40.0	40.2 (Aug.)
Average hourly earnings, Michigan (\$) ..	447.94	354.00	485.88 (Aug.)
Average hourly earnings, U.S. (\$)	331.89	354.00	353.36 (Aug.)
U.S. motor vehicle production (units)	571,436	696,935	854,379 (Sept.)
Electricity usage (mil. kwh.):			
Michigan	5,392	5,327	5,615 (June)
United States	168,739	158,832	171,519 (June)
Raw steel production:			
Michigan (000 net tons)	550	620	523 (Aug.)
United States (000 net tons)	5,538	6,921	7,020 (Aug.)
Consumer price index (1967 = 100)			
Detroit area	294.9	298.8	299.2 (Sept.)
United States	293.3	300.3	301.8 (Sept.)
U.S. producer price index (1967 = 100)	299.3	304.9	305.3 (Sept.)
Michigan farm prices received index			
(1977 = 100)	199	130	130 (Sept.)

SOURCE: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Ward's Automotive Reports; American Iron and Steel Institute; and Energy Information Administration.

Permit Authorized Construction in Selected Counties, First 8 Months 1982 and 1983

(Thousands of Dollars)

County	Residential			Industrial			Office		
	1982	1983	Percentage change	1982	1983	Percentage change	1982	1983	Percentage change
Allegan	1,737	3,929	126	34	180	429	0	60	100
Antrim	2,477	5,062	104	110	0	-100	0	0	0
Berrien	3,536	5,873	66	1,220	39	-97	2,462	2,700	10
Clinton	2,901	4,958	71	12	0	-100	0	0	0
Emmet	3,895	3,903	0	111	0	-100	0	0	0
Genesee	10,335	15,343	48	1,588	1,477	-7	2,565	5,536	116
Grand Traverse	6,678	13,380	100	398	129	-68	638	664	4
Ingham	10,959	20,780	90	103	340	230	16,442	5,138	-69
Jackson	4,807	3,643	-24	65	0	-100	137	0	-100
Kalamazoo	10,045	21,327	112	25,759	3,071	-88	1,263	1,421	13
Kent	24,877	59,085	138	16,843	7,437	-56	4,044	4,838	20
Livingston	5,661	10,884	92	1,424	15	-99	451	250	-45
Macomb	21,640	64,637	199	2,281	6,958	205	2,165	3,807	76
Midland	3,431	11,375	232	0	405	100	0	348	100
Muskegon	3,168	5,719	81	275	338	23	665	373	-44
Oakland	40,617	159,847	294	12,038	9,899	-18	17,259	89,388	418
Ottawa	9,069	25,930	186	1,169	3,024	159	180	1,971	995
Saginaw	3,816	4,055	6	60	190	217	347	1,086	213
St. Clair	3,685	9,136	148	682	212	-69	270	1,498	455
Washtenaw	13,479	19,008	41	2,643	7,133	170	6,511	12,911	98
Wayne	44,548	68,935	55	157,943	37,326	-76	8,297	5,317	-36
Michigan	332,707	674,081	103	231,657	97,975	-58	69,208	145,198	110

SOURCE: Bureau of the Census, special release.

urbs has important implications for both the future growth of the suburbs and Detroit.

In the near future, sector movement will be most active in Oakland County. Already one of the nation's wealthiest counties, its wage earners tend to have larger and more secure incomes than their counterparts in Macomb and Wayne counties. In 1979 60 percent of all families in Oakland County had annual family incomes of \$25,000 or greater as compared with 55 percent and 43 percent of all families respectively in Macomb and Wayne counties. The Detroit SMSA average is 48 percent. Furthermore, continuance of high income for Oakland County's wage earners seems more secure as compared with wage earners in other counties. The Detroit area economy, as the current structural changes progress, will soon demand more participants in such occupations as managers and professionals and demand fewer in such occupations as operators, fabricators and laborers. The manufacturing sector will also decline in economic importance. As of 1980, 31 percent of Oakland County's employed residents were managers or professionals. Only 20 and 19 percent of Macomb and Wayne counties' employed residents had such occupations. Additionally, 29 percent of all Oakland County's employed residents worked in manufacturing industries whereas 35 and 32 percent of all Macomb and Wayne counties' employed residents worked in these industries.

Regarding the future security of incomes in leading upper-class or upper middle-class sectors in each county, wage earners in the Oakland County sectors face the most appealing prospects. Upper-class sectors 1, 3, and 5, all in Oakland County, respectively had 55, 41, and 41 percent of their employed residents classified as managers and professionals. In Wayne County the upper-class sectors 2 and 6, excluding the Grosse Pointe sector, respectively had 39 and 31 percent of their employed residents classified as managers and professionals. Macomb County's leading sector, the upper middle-class sector 7, had only 25 percent of its employed residents working in this category. The underlying importance of these figures is that families with high and secure incomes are more inclined to purchase new housing and thereby initiate the process of sector movement and residential filtering. The preceding socioeconomic statistics indicate that this process will more likely occur in Oakland County.

As Detroit's centers of white-collar employment gradually shift from the downtown and uptown areas of Detroit to locations in Southfield and Troy, new upper-class sectors will eventually be created in Oakland County. A new upper-class sector will likely be formed in the Clarkston/Lake Orion/Oxford/Metamora area in the picturesque morainic belt crossing Oakland County. Further promoting this development will be Metamora's existing heritage of wealth. Wage earners residing in this area will commute to their offices in Troy via I-75 and M-24. Commerce Township, again located in this belt, is also likely to become an upper-class sector, and its wage earners will commute to their offices in Southfield via the proposed extension of M-275 and I-696. Novi Town-

ship, also bisected by I-696, will conceivably become an upper middle-class sector, not an upper-class sector, since it has some industrial activity and its topological features are not as attractive as those in nearby Commerce and Northville townships. None of these future residential sectors, nevertheless, will be more than an hour's commute from the residences of its wage earners to their places of employment.

As a consequence of the appearance of new upper-class sectors, communities such as Troy and Avon Township will be engulfed in an upper middle-class sector as residential filtering occurs. Southfield will probably become a lower middle-class sector. Royal Oak, Berkley, Madison Heights, and Oak Park are destined to become communities in lower-class sectors. Birmingham and Bloomfield Township, however, will probably remain part of an upper-class sector for many years. Despite the old housing stock which characterizes Birmingham—80 percent of all its residential units were constructed prior to 1960 as compared with 18 percent in Troy and 27 percent in Avon Township—this area has a strong tradition of wealth, and this generates a great amount of civic pride. This characteristic is also found in the Grosse Pointe sector. Birmingham's relative home value ratio has accordingly increased from 1.63 in 1970 to 1.83 in 1980.

Corresponding to the uncertainty of their wage earners' future income levels, sector movement in Macomb and Wayne counties will be much more restrained. These families will be less mobile regarding their choices of residences due to income restraints. There will be tendencies to own houses for more years than usual, and neighborhood pride will be promoted to keep home values from declining. These efforts will brake the process of residential filtering. East Detroit, Warren, Livonia, and Dearborn will be part of lower middle-class sectors well into the future. Upper middle-class sectors might someday appear in Washington and Chesterfield townships in northern Macomb County and Salem and Superior townships just beyond the western border of Wayne County.

Future prospects for downriver sectors 16 and 18, composed of such communities as River Rouge, Ecorse, Allen Park, and Taylor, are bleak. In fact, sector 18 might soon become a lower-class sector. Structural changes in the national economy are playing havoc in this area. A double curse is present here considering that many wage earners in each sector are employed in low-skill manufacturing occupations. Twenty-seven and 32 percent of the employed residents respectively in sectors 16 and 18 are employed as operatives, fabricators, and laborers, the highest percentages of all suburban sectors. Many are employed in mature or declining industries like steel and chemicals. This industrial decline has been occurring for a number of years, predating the dilemmas of the automobile industry. These industries, whose profit margins are currently quite low and unstable, cannot feasibly offer the high wages expected in this local economy to low-skill laborers. Consequently, by the summer of 1982 at least 47 percent of the jobs that existed three years earlier with the sixteen largest downriver employers

had disappeared as the result of manufacturing plant shutdowns.² In the past five years, the large downriver industrial concerns of BASF Wyandotte Chemicals, Firestone Rubber and Tire, and Whitehead and Kales permanently closed their manufacturing operations. New industries are not present for the same reasons mature and declining industries are vacating this area.

As a reflection of this economic uncertainty, relative home value ratios in all communities in the downriver sectors are declining. Even Taylor, where 52 percent of all residential units were built between 1970 and March 1980, saw its relative home value ratio fall from .96 in 1970 to .87 in 1980. During this period the relative home value ratios in River Rouge and Ecorse, sector 18, fell from .65 and .72 to .49 and .54. The housing stock in sector 18 is also quite aged. Forty-eight percent of all residential units were built prior to 1940 and only 4 percent were built between 1970 and March 1980. In comparison with all other suburban Detroit sectors, sector 18 had the lowest percentage of its employed residents working as managers and professionals (10 percent) and the greatest percentage in manufacturing industries (42 percent). Factories of several old industrial concerns are found within the sector's approximate twelve square miles. In addition, the ultimate destroyer of home values, the Detroit Sewage Disposal Plant, is located directly across a small river from River Rouge.

Fifteen miles from the downriver sectors, and literally on the other side of the tracks, is the unique upper-class Grosse Pointe sector 4. Its southern border faces one of Detroit's worst ghettos. Its other borders front middle-class neighborhoods in Detroit and St. Clair Shores. Unlike the other suburban sectors, the Grosse Pointe sector is stationary. Residential filtering has not occurred despite the sector's old housing stock. Eighty-seven percent of all residential units were constructed in 1959 or earlier, and only 3 percent were constructed between 1970 and March 1980. Still, between 1970 and 1980, the relative home value ratios in Grosse Pointe Park, Grosse Pointe Farms, and Grosse Pointe Woods either remained constant or increased respectively from 2.12, 2.10 and 1.76 to 2.12, 2.16 and 1.82.

Grosse Pointe has been an upper-class suburban sector since the 1920s. Located on a beautiful and safe site on Lake St. Clair, it was the site of the summer cottages of Detroit's most powerful industrialists of the eighteenth century. Their sons, with surnames of Buhl, Alger, and Newberry, built magnificent lakefront mansions there during the 1910s and 1920s. Earlier upper-class residential sectors had been situated on East Jefferson Avenue, overlooking the Detroit River, in the area of Jefferson and Chene Streets, and later the Indian Village district. All of these upper-class sectors constituted, during their apex, the fringe of urban Detroit.

Movement of the upper-class sector away from Grosse Pointe was blocked after World War II. Middle-income families, unprecedentedly high in numbers, outbid the high-income families of Grosse Pointe, few in number, for the vacant land which is now St. Clair Shores. The number of Detroit's middle-income families was burgeoning

as the autoworkers obtained large wage increases through the bargaining efforts of the UAW. With their strong propensity to participate in outdoor recreational activity, the autoworkers were greatly attracted to the available residential sites in St. Clair Shores. Almost immediate access was available to Lake St. Clair. It's no accident that St. Clair Shores has often been dubbed the "motorboat capital of America." Beyond St. Clair Shores the marshy lakefront locations are essentially unable to accommodate any large amount of residential activity.

Grosse Pointe saw its lofty socioeconomic status threatened as low-income families obtained the homes on Detroit's lower east side vacated by the middle-income families now moving to St. Clair Shores and Clinton Township. In order to prevent residential filtering, a number of public and private procedures were implemented. Civic pride was promoted as each Grosse Pointe municipality established large lakeside community parks equipped with swimming pools, tennis courts, and boating facilities. An excellent public school system was also maintained. Besides the financial barrier of well-above average home values, the point system followed by Grosse Pointe realtors for a number of years effectively screened unwelcome families from residing in Grosse Pointe. In all fairness, the Grosse Pointe sector has a well-established patina of wealth, and this characteristic, as was mentioned previously in regard to the Birmingham-Bloomfield area, is inherently a strong font of both public and private civic pride.

Dearborn sector 12 has also successfully repelled residential filtering in spite of the fact that it has always been a middle-class sector. In particular, Dearborn has blocked the movement of low-income families by calling upon strong civic pride and through vigorous efforts on the part of the late mayor, Orville Hubbard. Although housing stock is old—90 percent of all residential units built prior to 1960—Dearborn's relative home value ratio remained constant from 1970 to 1980 at 1.16.

DETROIT'S DECLINE

Aided by the rise in real family income, increased use of the personal automobile, and the extension of expressways well beyond the city's border in the period after World War II, Detroit's plight worsened as the suburbs expanded. Low-income families now form a greater than ever percentage of its residents as a result of residential filtering. As compared with other urban Detroit municipalities in 1980, only Royal Oak Township had a median family income level lower than Detroit's. Another product of residential filtering is the extreme case of neighborhood blight in the inner core of Detroit as the city's population fell from 1,849,568 residents in 1950 to 1,203,339 residents in 1980. During the same time period, Detroit's suburban population increased from 1,166,629 residents to 2,753,010 residents. Old and vacant houses, interspersed with vacant lots where houses once stood, are now features of Detroit inside a boundary formed by Grand Boulevard.

Commercial activity also fled to the suburbs. As middle- and high-income families moved to the suburbs, re-

tail trade followed in order to insure that it maintain a stable customer base. In 1948 Detroit had 18,242 retail establishments with 114,038 employees, whereas the remainder of the Detroit SMSA had 9,989 retail establishments with 48,124 employees. By 1977 Detroit had only 6,914 retail establishments with 48,457 employees while the remainder of the SMSA had 21,363 retail establishments with 205,605 employees.

Concerning the shift in employment center of white-collar employees from Detroit to the suburbs, one can visibly notice the new, large office buildings now in Southfield and Troy. Bendix, Budd, Ex-Cell-O, and Kresge relocated their corporate headquarters to suburban sites during the past two decades. Average office rentals in the suburbs now exceed those in downtown Detroit.

Technological change in manufacturing processes, induced by the early automobile industry, has also hurt the city of Detroit. Mass assembly techniques dictated larger, single-floor work space requirements and thereby increased industrial demand for land. Thus many of the factories of automobile and automobile-related industries were constructed on vacant suburban lands outside Detroit after World War II, where both land prices and taxes were lower, particularly in Warren, Sterling Heights, Flat Rock, and Southgate. In addition, in the less populous suburbs factories received fewer complaints about negative spillover effects such as increased traffic congestion, factory noise, and pollution. In 1947, 3,272 manufacturing establishments with 338,373 employees were found in Detroit and 1,493 manufacturing establishments with 217,415 employees were located in the balance of the Detroit SMSA. Thirty years later, Detroit had 1,954 manufacturing establishments with 153,300 employees in comparison with 5,964 manufacturing establishments with 411,300 employees in the balance.

As a result of these socioeconomic changes, annual fiscal problems are standard bill of fare in Detroit, as well as in select downriver communities. The city's wealth is fleeing to its suburbs and other locations. It is of crucial importance that Detroit is losing its middle-income families, which is a very substantial group in size. As a consequence of this, even between March 1977 and March 1980 nominal median income for Detroit families fell 11 percent to \$15,984, whereas for the Detroit SMSA this figure rose 26 percent to \$26,086.³ Low-income families, living in a badly aged housing stock (as of 1980, 46 percent of Detroit's residential housing was constructed prior to 1940), now form a greater and greater percentage of Detroit's total residents. Although these families demand more public services than the other income classes, they provide only minor contributions to the city's tax revenues. Furthermore, although Detroit's municipal workers are among the highest paid in the nation,⁴ public services such as police and fire, protection and bus service are inefficient. As the city depopulates and inner-city neighborhoods become less dense in population, longer police and fire runs are necessary in order to provide service to a specified number of residents. Bus runs also must become longer and make more stops.

Therefore, the quality of public services deteriorates and its cost escalates.

All of the preceding factors have combined to make Detroit a less desirable place to live. Low-income families dominate the city. The resident population is continually shrinking, as are employment opportunities. Furthermore, shopping is inconvenient because many retail shops have relocated to the suburbs, and the provision of public services is suboptimal. Mirroring this worsening in living conditions, Detroit's relative home value ratio declined to .49 in 1980 from .80 in 1970. Tied with River Rouge, another economically depressed municipality, this is the lowest relative home value ratio in the Detroit SMSA.

DETROIT RENAISSANCE?

Detroit is reestablishing middle- and upper-class sectors in the areas of substantial acreage surrounding downtown Detroit. This alternative is also feasible for the now unused riverfront industrial properties in the downriver sectors. Residents would enjoy having immediate access to the Detroit River and ultimately the Great Lakes. In Detroit, middle- and high-income families are near many amenable cultural and sporting activities. Many professionals and managers, who are unencumbered with children and employed in downtown Detroit, are finding downtown living preferable to suburban living. Instead of spending their time commuting, they would rather spend it enjoying the entertainments of downtown Detroit. Projects such as Trolley Plaza, Riverfront West, Millender Center, and the proposed residential projects of American Natural Resources and Stroh Corporation along the Detroit River are definitely beneficial monuments toward this end. Also, if successful they will serve as magnets for further residential growth to house high- and middle-income families and for various retail shops in the area.

Still, new upper-class residential developments in Detroit are extremely risky business ventures. They seek to reorient high- and middle-income families back to Detroit, actions denying the traditional behavior as prescribed by the sector theory. The success of even the existing projects is by no means assured. Their competition is stronger. The pace of construction of new upper-class and upper middle-class communities in the suburbs will also quicken as the current recovery results in rising family incomes and reasonable interest rates. Wage earners as a group have less tendency to reside in a downtown location since they are not crucially dependent on employment opportunities in Detroit. Excluding the Grosse Pointe and Southfield sectors, 4 and 8, only 18 percent or less of employed residents of each upper-class and upper middle-class sector now work in Detroit.

Thus, tax incentives and Federal grants are necessary in the short-run to induce real estate developers to construct such projects in Detroit. All existing new and proposed downtown residential developments have or are attempting to obtain tax abatements and/or Urban Development Action Grants. These are necessary actions until the new middle- and upper-class neighborhoods are firmly established within Detroit.

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1. Ernest W. Burgess, "Residential Segregation in American Cities" (1928), in *The Basic Writings of Ernest W. Burgess*, ed. Donald J. Bougue, 1974, 119.
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Forecast Update

by GEORGE A. FULTON, assistant research scientist, and DONALD R. GRIMES, research associate, Institute of Labor and Industrial Relations, University of Michigan

Employment data for the first half of 1983 have now been compiled by the Michigan Employment Security Commission. Forecasts of total jobs in the outstate SMSAs for this period were published in the March-April issue of *The Michigan Economy* (Table 5); in the table below, these projections are compared to the recently released actual outcomes. The forecasts appear to be on track. In all cases the job levels predicted earlier in the year deviate by less than 1 percent from the actual outcome, with a number of results being virtually on the mark. If any tendency can be noted in the small errors, it would be that the automobile-based economies of the southeast region, especially Ann Arbor, Flint, and Saginaw, have grown a bit more rapidly than anticipated.

Total Jobs in the Outstate SMSAs,
Seasonally Adjusted, January-June 1983:
Comparison of Projected and Actual Occurrences

Region	Projected	Actual	Error	Error as % of Actual
Ann Arbor	127,400	128,500	-1,100	0.9
Battle Creek	59,800	60,000	-200	0.3
Bay City	31,600	31,700	-100	0.3
Benton Harbor	54,200	54,000	200	0.4
Flint	174,700	176,200	-1,500	0.9
Grand Rapids	262,500	261,600	900	0.3
Jackson	45,300	45,200	100	0.2
Kalamazoo	103,500	103,400	100	0.1
Lansing	186,500	186,700	-200	0.1
Muskegon	54,900	55,200	-300	0.5
Saginaw	76,700	77,300	-600	0.8
Southeast	642,200	645,600	-3,400	0.5
Southwest	534,900	534,200	700	0.1
Total outstate	1,177,100	1,179,800	-2,700	0.2

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Northwest Michigan: An Economic Review and Outlook

by SCOTT D. PHILLIPS, executive director, Data Research Center, Inc.,
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Record Eagle

Northwest lower Michigan—spanning a ten-county region of approximately one hundred miles north and south of Traverse City and reaching east to I-75—is returning to a period of strong economic growth. The pattern of that growth, however, will differ in both scope and composition from the spectacular economic expansion of the 1970s. A brief review of the changes in the region since 1970 and a description of the base upon which new growth will build is useful before describing the likely nature of growth in the region during the rest of this decade.

THE 1970 TO 1983 PERIOD

The Traverse City and northwest Michigan area has been one of Michigan's several bright spots since the early 1970s. Fueled by a robust economy, total employment increased over 80 percent, and total population increased 31 percent through 1980. An average of 4,000 persons migrated to the region each year, many finding jobs in the oil and gas, manufacturing, tourism, and health-care industries.

The growth of the region during the 1970s was largely created through "demographic push." Because the area was perceived to have a high quality of life, people moved in, started businesses, and prospered as in-migration continued. In addition to its permanent population of 209,975 in 1983, seasonal residents and transient visitors nearly double the level of population during peak summer months.

The region has benefited from the unforeseen rural revival, with over one-third of in-migrants moving from more densely populated southeast Michigan. Many brought values that combined a respect for the natural resources of the area and a desire to earn a good living in business. Consequently, the region is characterized by many small manufacturing and service-oriented businesses with fewer than fifty employees. The large businesses tend to be regional support centers such as health-care, education, and financial institutions.



Northwest Michigan



Michigan



United States

The economy is quite diversified, more closely mirroring the United States economy than the manufacturing-dominated economy of Michigan. Much of the manufacturing that exists is related to food processing of local agricultural products. Durable manufacturing is related to automotive parts and specialized machinery for manufacturers located outside the region. The basic, export related, industries of the region include tourism, agriculture, oil and gas, and manufacturing. It is these industries that have created most of the job growth and spawned the many service-oriented businesses of the area. The professions, including doctors, lawyers, accountants, and business services, have enjoyed tremendous opportunities since 1970.

The growth of population during the 1970s had major impacts on land use and development. Subdivisions were constructed in previously undeveloped areas; demands for low-income, senior citizen, and handicapped housing created multifamily developments. Industrial parks flourished, and commercial buildings were constructed in remote areas. In fact, growth in commercial and retail establishments within the boundaries of Traverse City resulted in a decline of resident population from 18,048 in 1970 to an estimated 15,588 in 1983. The resident population of contiguous townships grew over 75 percent during the same period, causing heated debates about growth. Public expenditures for streets, water, sewer, and other utilities brought the debates to the forefront as relative tax bases of local units of government shifted.

This combination of a diversified economy and significant growth in the region produces economic cycles much different from that of the state as a whole. During the 1981-82 recession, northwest Michigan fell between the state and the nation in terms of both duration and initial month of recession, yet led both the nation and the state in terms of initial month of recovery. The evidence suggests that this region's economy behaves more similarly to the national than the state economy: the regional recession was only two months longer than that of the nation. The industrial mix more closely mirroring that of the nation provides the best explanation for these data.

It is apparent that the 1981-82 recession did significantly impact northwest Michigan. The unemployment rate reached 13.6 percent on an average annual basis in 1982, with some counties having rates in excess of 20 percent. The region's recession was caused by two major factors. First, the same interest-rate factors that caused the national recession affected the region's manufacturing industries. Second, the severity of the recession on the state level, particularly southeast Michigan, resulted in an especially weak tourism market. The Detroit area is a major tourism market for northwest Michigan; as people migrated from Detroit and as those remaining became concerned about personal financial positions, the number of tourists declined dramatically. Evidence shows, for example, that the number of tourists dropped by 35 percent from 1980 to 1982.

The 1981-82 recession was the first for northwest Michigan in well over fifteen years and has affected both the level of population and attitudes about economic development. During the past year total population declined by forty-seven hundred persons, with very broad evidence of declines in school enrollments, electric meters, voter registrations, births, deaths, and labor-force statistics. Taking into account natural increases that occur, we estimate that approximately six thousand persons migrated from the region between spring 1982 and 1983. The following chart documents population migration since 1970.

Average Annual Migration Rate: Northwest Michigan

1970-80	1980-81	1981-82	1982-83
4,073	2,271	1,275	-6,076

BUSINESS DEVELOPMENT CONSIDERATION

Several major schools of thought about economic development were evident during the 1970s. Most elements of the business community wanted as little local control on growth as possible and at the same time wanted growth limited. That apparent contradiction was, in fact, a conservative, free-market outlook and a feeling that the status quo was just fine. At the same time, however, there was a strong fear of competition from new market participants.

Another major factor in the 1970s and early 1980s was a belief that the region offered an exceptional environment of clean waters, vast wooded areas, charming small-town living, low crime, and low population density. The need to maintain these qualities, while vigorously expressed, was infrequently acted upon as a guide for developing zoning patterns and community plans. Local community master plans reflect what was already in existence with some provisions for more of the same. None redirected the already apparent courses of development.

Some, who felt the region was heading down the path of urban sprawl and environmental exploitation, actually saw the recession as a much-needed pause for regrouping efforts towards rational community and regional planning. Others, while not pleased by the hardships brought about by business failures and high unemployment rates, saw a chance to redefine the direction of economic growth. Members of the Traverse City Industrial Fund, for instance, now saw a need to court prospects in light manufacturing, computer-related operations, and information-based industries, as opposed to the earlier thrust toward automobile-supplier firms, heavy machine operations, and raw-materials processing. At the same time, the local Chamber of Commerce established a new business development committee geared specifically toward promoting the region as a site for so-called "clean" businesses—communications, data-base services, high technology development, service operations, and health care.

The attitude has changed over the time of the recession from passive acceptance of growth to promotion and active recruitment of specific, compatible industries. Part of that change came from the trauma of seeing some automobile-supplier plants laying off large numbers of workers and others shutting down permanently. The region had not experienced such a massive economic dislocation in recent history. Suddenly economic development received much attention from both private and public sectors.

For the most part the business community in the region changed from an attitude of cautious optimism six months ago to one of planning for growth and making incremental investments in expansion. Economic development agencies, such as Traverse Area Industrial Fund, Traverse City Area Chamber of Commerce, and the Grand Traverse Economic Development Corporation are seeing greatly increased inquiries from existing and new business prospects.

Another attitude change that occurred was from general acceptance of the local business climate, however inhospitable some might have found it, to exploring ways

of encouraging appropriate new business development and creating an "incubation" climate for promising start-up operations. That was clearly expressed when both Traverse City and adjoining Garfield Township began to treat property tax abatements for new plants as a matter of general policy rather than exceptions to the rule.

For many years economic development agencies lamented the region's transportation shortcomings. Several hundred miles from major markets like Detroit and Chicago, the northwest lower Michigan region was not serviced directly by freeway, had limited rail service, and suffered very uneven airline scheduling, dominated primarily by seasonal tourist needs. Recently, however, air service has been greatly augmented by two commuter operations. Freeway development into the region still remains a long-term proposition at best, with the state highway department forecasting an extension of the north-south highway, U.S. 131, above Cadillac sometime around the year 2000. Rail service to the region continues to diminish, with a likely prospect of complete elimination when state subsidies run out within a year or two.

At the same time, though, planners are seeing a chance to attract businesses that have less demand for long-haul bulk transportation service. Information services, for instance, require little more than reliable phones. The very remoteness and rural style of life of the region, they say, can become a strong draw for professionals—engineers, software designers, computer applications specialists, etc.—who place a high premium on quality of life.

Many economic development leaders in the region have expressed the need for a coordinated, comprehensive plan for promotion of the region to so-called "target" industries and businesses. Unfortunately, while the need is generally acknowledged, the efforts in that direction have been fragmented and sometimes contradictory. For example, there is no coordinating body that facilitates the establishment of developmental priorities. Community and industrial development groups have found themselves on occasion competing for the same funds and prospects or not following up contacts by potential new-business clients, thinking that another agency will respond. While most will agree that business and job retention are important, there is disagreement as to who should be responsible for such programs and how they should operate.

Yet important steps in the direction of making the region attractive to new business development have been taken. First, communities have created attractive industrial parks. Second, most counties in northwest lower Michigan have established economic development corporations. In addition, a number of agencies can make available a variety of financing tools such as the SBA 503 loan program. Finally, and perhaps most important, there is an increased awareness in the business and government community of the need for a more unified and strategic plan of action to make the region an attractive place to live and work. After five years of dissension for one reason or another, the recent approval of a new downtown development in Traverse City is an example of

many diverse groups tangibly agreeing on appropriate development.

OUTLOOK

You will recall the chart showing declining rates of net in-migration during 1980-82 and out-migration during 1982-83. Is this a trend or an aberration from a longer term trend? We believe most evidence supports the notion that net out-migration is an aberration and that net in-migration will resume this year, though at levels lower than that of the 1970s. First, we cite current economic conditions outlined in *Economic Characteristics Report*, 1983 describing the lowest level of total employment since 1978. Certainly, we posit that the recent reduction in population is directly related to diminished employment opportunities. Second, we cite studies by Dr. Goldberg from University of Michigan, Dr. Beegle from Michigan State University, and Laurence Rosen from the Michigan Department of Management and Budget describing the rural revival. People will continue to value the region because it offers a high quality of life, good environment, and recreational, cultural, and commercial opportunities. Quoting from Rosen's paper, *The Future of Michigan's Population*, "As the economy improves, migration to the north is expected to accelerate once again. We expect that Traverse City will continue to grow into Michigan's next metropolis of the north during the 1980s and 1990s."

Finally, we cite *Megatrends* as evidence that the outlook for employment opportunities necessary to support population growth is promising. Among the trends the book observes are (1) transition from an industrial society to an information society and (2) transition from centralization to decentralization. Both trends support the notion that employment opportunities will exist in the more rural areas of the country. As more occupations are related to information and communications, there will be less need to be located near centers of durable goods production.

As the economy improves, we expect a return to net in-migration. Evidence suggests the economic recovery is well underway in the region. For example, Table 1 illustrates the current strength in seasonal employment trends. The immediate Grand Traverse and northwest

Table 1
Percent Change in January to June Employment

Year	Grand Traverse Area	Northwest Michigan	Michigan	United States
1974	3.8	7.0	0.2	3.8
1975	16.9	11.0	-0.2	3.1
1976	12.5	9.8	5.4	4.8
1977	22.0	13.6	4.3	5.6
1978	17.9	13.0	3.1	5.3
1979	16.3	11.2	3.8	3.7
1980	10.1	7.3	-1.2	1.8
1981	10.9	10.1	3.3	3.3
1982	11.4	11.3	-0.7	2.9
1983	14.4	11.5	1.1	6.4

(Continued on page 8)

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Michigan Economic Indicators

Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	39.8	43.5	43.3 (Oct.)
Average weekly hours, U.S.	39.0	40.8	40.7 (Oct.)
Average hourly earnings, Michigan (\$) ..	11.08	11.78	11.79 (Oct.)
Average hourly earnings, U.S. (\$)	8.56	8.90	8.91 (Oct.)
U.S. motor vehicle production (units)	556,678	854,379	936,115 (Oct.)
Electricity usage (mil. kwh.):			
Michigan	5,392	5,327	5,615 (June)
United States	168,739	158,832	171,519 (June)
Raw steel production:			
Michigan (000 net tons)	413	508	637 (Oct.)
United States (000 net tons)	5,262	7,134	7,692 (Oct.)
Consumer price index (1967 = 100)			
Detroit area	295.2	299.2	298.2 (Oct.)
United States	294.1	301.8	302.6 (Oct.)
U.S. producer price index (1967 = 100)	299.8	305.3	306.3 (Oct.)
Michigan farm prices received index			
(1977 = 100)		130	137 (Oct.)

SOURCE: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Ward's Automotive Reports; American Iron and Steel Institute; and Energy Information Administration.

Permit Authorized Construction in Selected Counties, First 10 Months 1982 and 1983

(Thousands of Dollars)

County	Residential		Industrial		Office		Mercantile	
	1982	1983	1982	1983	1982	1983	1982	1983
Allegan	2,276	4,814	34	191	0	277	75	317
Antrim	3,705	6,175	110	0	0	0	1,106	0
Berrien	4,666	7,154	4,234	439	2,587	2,700	168	223
Clinton	4,118	6,965	13	35	0	0	335	217
Emmet	4,529	5,172	128	0	0	0	0	0
Genesee	12,166	19,260	1,608	2,425	3,457	7,180	4,562	5,454
Grand Traverse	9,455	16,743	457	347	753	744	1,646	470
Ingham	14,916	28,349	178	415	17,299	8,678	1,838	2,460
Jackson	6,272	4,987	77	106	353	306	451	214
Kalamazoo	12,473	26,007	25,819	3,453	2,539	2,546	2,339	1,306
Kent	40,101	77,547	54,225	11,401	4,986	6,798	3,805	4,843
Livingston	7,079	13,813	2,115	95	451	585	669	1,404
Macomb	32,602	80,419	7,096	30,191	2,508	6,374	5,241	12,873
Midland	4,552	15,068	0	405	0	482	0	476
Muskegon	4,616	7,557	476	548	137	373	202	720
Oakland	67,083	205,678	17,967	21,095	25,609	101,723	7,242	10,703
Ottawa	12,780	31,720	2,768	4,475	402	2,490	910	5,172
Saginaw	4,393	5,111	60	336	347	1,086	1,207	1,230
St. Clair	5,170	11,202	1,419	912	331	2,401	419	631
Washtenaw	15,571	26,406	3,198	7,382	6,666	13,692	1,042	1,614
Wayne	69,570	85,075	158,806	53,859	10,745	9,419	13,248	16,527
Michigan	472,586	862,635	295,904	161,969	86,546	178,995	57,249	85,687

SOURCE: Bureau of the Census, special release.

Year-to-Year Change in Selected Economic Indicators

Indicator	Percentage change from previous year												
	1982			1983									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Civilian Employment													
United States	-1.2	-1.1	-0.7	-0.6	-0.7	-0.5	0.0	-0.4	1.1	1.8	2.0	2.5	2.8
Michigan	-5.2	-6.8	-1.8	-0.2	-0.2	-0.2	2.0	1.2	2.0	2.5	1.7	2.9	2.3
Detroit area ^a	-5.9	-7.1	-2.0	-0.6	-0.4	-9.9	1.4	0.4	0.9	1.5	0.8	1.9	1.3
Outstate ^b	-5.7	-6.6	-3.8	-0.2	0.0	-0.4	2.6	2.0	2.9	3.2	2.5	3.8	2.8
Wage and Salary Jobs^c													
United States	-2.6	-2.5	-2.3	-1.6	-1.7	-1.4	-1.0	-0.6	-1.7	0.8	0.6	1.7	2.4
Michigan	-6.2	-5.5	-4.2	-2.9	-2.4	-2.4	-1.3	-1.4	-0.7	0.5	0.4	1.4	2.4
Detroit ^a	-6.3	-5.9	-4.0	-3.0	0.0	-2.9	-1.8	-1.9	-1.3	-0.7	-0.3	1.5	2.1
Outstate ^b	-6.2	-5.2	-4.4	-2.8	-2.5	-1.9	-0.8	-0.9	-0.2	1.5	1.0	1.3	2.7
Average Work Week^d													
United States	-1.8	-1.0	-0.5	5.6	-1.0	1.3	2.8	2.3	2.8	2.8	3.1	4.9	4.4
Michigan	-1.2	2.5	2.0	6.0	3.2	4.3	5.0	3.2	1.9	3.7	5.0	13.9	8.8
Average Weekly Earnings^e													
United States	3.1	3.8	4.4	9.3	3.7	5.9	7.0	6.2	6.3	6.6	6.5	8.7	8.6
Michigan	0.7	5.2	5.1	9.9	7.2	7.0	8.6	5.4	4.5	6.5	8.0	18.7	15.7
Motor Vehicle Assembly													
United States	-20.0	-0.9	10.2	39.3	41.5	20.2	7.1	14.0	13.7	1.5	34.6	50.4	68.2
Michigan	-24.3	2.7	11.6	15.0	21.2	13.0	3.7	4.2	1.9	-10.5	6.7	14.0	7.8
General Motors	-22.6	3.9	-6.9	9.0	6.0	14.8	7.1	10.0	1.5	-17.8	-7.3	12.4	-5.7
Ford	-26.6	2.5	100.1	62.5	34.9	3.6	-15.8	-19.5	-11.4	-16.7	20.7	5.5	37.3
Chrysler	-27.8	-0.8	26.4	-0.5	127.2	22.5	29.7	27.9	32.8	81.9	47.5	41.4	11.3
Steel Tonnage Poured													
United States	-41.6	-43.0	-41.9	-28.0	-21.0	-11.5	4.4	11.0	15.6	21.0	26.8	34.6	46.2
Michigan	-28.7	-39.0	-26.8	7.2	24.4	24.1	6.3	6.8	3.2	3.9	-5.0	6.5	54.1
Commercial Electricity Consumption													
United States	44.2	4.7	4.4	-2.1	-2.2	-0.3	1.6	0.6	2.0	5.6	7.0	8.6	n.a.
Michigan	-0.2	-2.8	-4.0	-1.0	-5.1	-0.3	-0.4	-0.5	2.4	-2.5	-0.4	7.7	3.6
Industrial Electricity Consumption													
United States	-12.0	-8.3	-8.8	-8.0	-5.9	-6.6	-3.4	0.3	3.8	5.6	5.2	16.1	n.a.
Michigan	-9.7	-14.1	-4.7	-3.6	8.0	2.2	1.5	2.9	5.6	0.0	2.9	11.3	9.8
Residential Building Permits													
Michigan	25.0	53.5	26.8	145.9	253.7	182.0	97.3	96.4	118.8	64.0	174.5	68.9	66.9
Industrial Building Permits													
Michigan	-25.5	46.7	-95.1	-5.0	25.6	-43.0	396.0	180.2	254.3	-43.6	295.2	27.5	156.2
Office Building Permits													
Michigan	-74.1	-61.4	-51.0	-47.3	44.0	-12.7	-55.0	177.8	6.0	864.8	-37.0	162.3	55.1
Mercantile Building Permits													
Michigan	-14.3	-63.5	-44.4	-22.1	-17.4	61.7	187.7	141.5	30.0	22.0	99.3	50.8	-40.0
Retail Sales													
United States	2.4	7.5	6.0	6.1	4.2	8.9	7.4	8.3	12.6	8.5	12.0	11.0	9.8
Michigan	-3.2	3.1	3.3	6.4	4.8	8.6	5.0	3.5	12.3	7.7	11.7	11.7	8.4
Detroit area ^a	-4.6	-1.0	1.1	8.8	9.9	11.7	6.5	5.5	13.3	11.1	13.5	12.3	7.0
Outstate ^b	-1.8	7.4	5.8	4.0	-0.1	5.5	3.6	1.7	11.0	4.5	10.1	11.2	9.7
Consumer Price Index													
United States	0.9	4.6	3.9	3.8	3.5	3.6	3.9	3.5	2.6	2.4	2.6	2.9	2.9
Detroit ^a	4.9	5.9	5.1	4.2	5.2	5.1	3.9	3.1	2.6	2.1	2.1	1.5	1.0

SOURCE: Michigan Employment Security Commission, special release; Bureau of Labor Statistics, *The Employment Situation* (monthly); Motor Vehicle Manufacturers Association, special release; American Iron and Steel Institute, special release; Energy Information Administration, special release; and Bureau of the Census, *Monthly Retail Trade* and special release.

a. Wayne, Oakland, Macomb, Livingston, Lapeer, and St. Clair counties.

b. Michigan minus Detroit area.

c. The number of wage and salary jobs, except agricultural, reported by employers.

d. Average hours worked by manufacturing production workers.

e. Average earnings among manufacturing production workers.

n.a. Not available.

Quarterly Personal Income in Michigan

	Millions of dollars, annual rates, seasonally adjusted								Percentage change	
	1981		1982				1983		83(1) to 83(2)	
	3	4	1	2	3	4	1	2	Michigan	United States
TOTAL LABOR AND PROPRIETORS' INCOME BY PLACE OF WORK										
BY TYPE										
Wage and salary disbursements	61,504	60,086	58,747	59,360	59,342	57,666	61,904	63,346	2.3	2.4
Other labor income	7,943	7,798	7,720	8,011	8,040	7,682	8,176	8,482	3.7	3.5
Proprietors' income	4,395	4,299	4,104	4,110	4,186	4,559	4,146	4,522	9.1	8.2
Farm	537	489	333	310	276	492	520	540	3.8	6.6
Nonfarm	3,857	3,810	3,772	3,800	3,910	4,067	3,626	3,982	9.8	8.6
BY INDUSTRY										
Farm	788	739	588	571	542	763	820	844	2.9	4.6
Nonfarm	73,054	71,444	69,984	70,910	71,026	69,145	73,407	75,506	2.9	2.8
Private	63,241	61,536	60,128	60,847	60,858	58,524	62,499	64,426	3.1	3.0
Ag. Serv., For., Fish., and other	168	172	172	172	177	185	184	186	1.1	1.0
Mining	450	429	403	331	326	316	284	273	-3.9	-1.0
Construction	2,982	2,901	2,829	2,600	2,763	2,882	2,725	2,888	6.0	4.6
Manufacturing	30,167	28,341	27,448	28,725	28,108	25,312	28,374	29,403	3.6	3.2
Nondurable goods	4,822	4,735	4,823	4,979	4,965	4,783	5,203	5,334	2.5	2.6
Durable goods	25,346	23,606	22,626	23,746	23,143	20,529	23,172	24,069	3.9	3.6
Transportation and public utilities	4,264	4,239	4,254	4,149	4,100	4,074	4,361	4,446	1.9	2.1
Wholesale trade	3,969	3,912	3,851	3,772	3,799	3,792	3,961	3,983	0.6	2.4
Retail trade	6,480	6,390	6,246	6,128	6,290	6,324	6,492	6,648	2.4	2.4
Finance, insurance, and real estate	2,987	3,071	2,851	2,908	2,991	3,106	3,330	3,500	5.1	4.5
Services	11,773	12,081	12,074	12,062	12,305	12,533	12,787	13,102	2.5	3.1
Government and government enterprise	9,812	9,908	9,856	10,063	10,168	10,621	10,908	11,080	1.6	1.8
Federal, civilian	1,260	1,287	1,263	1,306	1,334	1,345	1,358	1,385	2.0	2.2
Federal, military	235	267	262	264	268	274	274	280	2.2	0.1
State and local	8,317	8,355	8,331	8,494	8,567	9,002	9,275	9,416	1.5	1.9
DERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENCE										
Total labor and proprietors' income by place of work	73,842	72,183	70,572	71,481	71,568	69,908	74,226	76,350	2.9	2.8
Less: Personal contributions for social insurance by place of work	3,927	3,834	3,845	3,867	3,864	3,703	4,082	4,155	1.8	1.8
Net labor and proprietors' income by place of work	69,915	68,349	66,727	67,614	67,704	66,205	70,144	72,195	2.9	2.9
Plus: Residence adjustment	478	479	481	481	486	485	471	485	3.0	-2.5
Net labor and proprietors' income by place of residence	70,392	68,827	67,209	68,095	68,190	66,689	70,615	72,680	2.9	2.9
Plus: Dividends, interest, and rent	15,963	16,458	16,809	17,287	17,560	17,580	16,267	16,273	0.04	0.12
Plus: Transfer payments	14,294	14,717	14,772	15,604	15,754	17,125	16,668	16,446	-1.3	1.7
State U.I. benefits	1,041	1,497	1,471	2,063	1,673	2,627	2,092	1,633	-21.9	3.5
Transfers excluding state U.I.	13,252	13,220	13,301	13,542	14,081	14,498	14,576	14,813	1.6	1.6
Personal income by place of residence	100,649	100,002	98,790	100,987	101,504	101,393	103,549	105,399	1.8	2.2

SOURCE: Bureau of Economic Analysis, special release.

Quarterly Motor Vehicle Employment and Assembly

	1981				1982				1983		
	1	2	3	4	1	2	3	4	1	2	3
EMPLOYMENT*											
Chrysler											
Michigan	36,921	39,678	37,894	37,123	34,122	33,219	31,258	31,086	32,359	34,101	33,062
United States	68,024	73,664	70,629	68,020	64,498	62,320	59,234	59,563	61,587	65,886	65,027
Ford^b											
Michigan	93,873	93,068	87,785	84,349	80,373	87,618	78,801	80,674	80,638	83,001	77,878
United States	160,225	166,277	158,139	143,272	137,440	152,732	133,399	136,453	143,360	147,173	154,300
General Motors											
Michigan	251,000	255,000	241,000	239,000	217,000	215,000	215,000	202,000	207,385	213,634	215,515
United States	535,000	550,000	499,000	511,000	447,000	459,000	445,000	413,000	435,123	457,317	466,574
ASSEMBLY											
Dearborn	29,179	60,393	52,156	29,328	34,706	78,153	37,936	33,203	38,601	37,389	25,845
Detroit	109,906	111,040	71,571	83,801	77,020	98,484	65,148	92,465	114,242	123,232	62,827
Detroit (truck)	7,778	9,172	5,309	6,157	3,825	5,796	4,123	3,327	10,625	13,809	13,144
Flint	74,914	87,965	60,788	73,471	60,651	80,075	76,264	69,947	87,447	103,194	79,984
Flint (truck)	57,829	46,462	16,117	37,478	59,061	72,630	61,274	48,613	46,961	56,953	34,604
Kalamazoo ^c	628	442	1,110	813	860	1,160	138	—	—	—	—
Lansing	91,196	143,881	97,651	115,834	102,301	104,154	117,209	118,391	138,618	148,605	133,061
Pontiac	30,439	44,020	35,406	40,463	36,867	44,887	25,092	—	—	—	7,609 ^d
Pontiac (bus & truck)	26,584	26,845	22,977	36,999	42,307	39,849	23,163	32,028	45,288	57,069	50,455
Warren (bus & truck)	17,735	31,597	19,354	23,339	22,420	31,337	25,939	20,471	27,180	33,759	31,744
Wayne	74,448	70,912	65,004	52,961	40,725	75,109	53,873	45,366	51,603	65,137	57,983
Wayne (truck)	18,014	16,470	17,495	15,952	18,160	23,809	19,053	18,578	24,213	23,702	18,605
Wixom	13,695	22,602	9,730	17,158	24,573	26,782	20,248	26,017	27,079	36,041	23,877
Ypsilanti	79,205	85,796	56,277	43,055	42,114	54,368	56,079	32,400	39,406	46,373	35,813
Total Michigan											
Passenger car	503,610	627,051	449,693	456,884	419,817	563,712	451,987	417,789	496,996	559,971	456,263
Bus and truck	127,940	130,546	81,252	119,135	145,773	173,421	133,552	123,017	154,267	187,292	148,552
Total United States											
Passenger car	1,553,386	2,019,691	1,380,133	1,304,000	1,070,724	1,564,545	1,236,235	1,205,800	1,501,715	1,775,911	1,574,183
Bus and truck	452,000	504,000	337,000	397,000	465,000	595,000	454,000	396,000	518,000	637,000	585,383
Total Canada											
Passenger car	183,500	271,000	157,000	173,000	196,000	252,000	182,000	156,000	234,565	293,060	179,285
Bus and truck	139,000	140,000	100,000	118,000	115,000	150,000	94,000	90,000	119,564	151,415	114,777

SOURCE: Ward's Automotive Reports; Motor Vehicle Manufacturers Association of the United States, Inc., P-I report; and companies.

a. Average monthly wage and salary employment of companies with assembly plants in Michigan; includes nonautomotive.

b. Excludes Ford Aerospace and Communications Corporation and finance and insurance subsidiaries.

c. Checker no longer produces vehicles.

d. Preliminary data.

THE MICHIGAN ECONOMY

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Michigan areas show stronger than average gains in seasonal employment. Early indicators like new construction contracts and deed transactions are showing modest but upwards trends for the construction industry, and real estate inquiries for commercial properties are up sharply. Local financial institutions are at the highest state of liquidity in years and are very competitive for qualified loan prospects. Other indicators that tend to show a strong likelihood of recovery and renewed economic expansion include strong consumer demand for both soft goods and durables, increasing tourism activity, plant reopenings and expansions, and, significantly increased help-wanted advertising for the past six months over the same period a year ago.

Therefore, our projections of total population show a low level of in-migration during 1983-84 as the economy takes up slack in the unemployed civilian labor force. In addition, we project in-migration to increase through 1986, though at levels substantially lower than the 1970s, moderating thereafter through 1990.

Population Projections, 1984-90: Northwest Michigan

1984	1985	1986	1987	1988	1989	1990
212,000	215,900	219,000	223,100	227,300	229,600	231,200

This projection implies a growth rate of about 11 percent between 1980 and 1990, compared to the 31 percent growth rate between 1970 and 1980. The nature of this net in-migration will also contrast with that of the 1970s. You will recall that we termed the growth of the 1970s as demographic push. People took risks to move here and were able to find or create employment opportunities. In contrast, the people that move to the region during the 1980s will be moving to existing or fairly certain employment opportunities. Therefore, we might call future in-migration "economic pull." The destiny of future population growth will depend entirely on the success of public and private economic development efforts discussed earlier. The prospect of Grand Traverse Resort

as a regional and nationwide recreation facility, for example, is the type of development in a base industry upon which future population growth will depend. Efforts to attract corporate headquarters, satellite offices, and data processing facilities, if well developed and executed, will find a growing market willing to consider northwest Michigan as a very desirable site location. Perhaps critical to this effort will be the following factors: (1) an approach to business development not segmented by units of government or special interests; and (2) attention to product development including examination of total business costs, supply of appropriate labor and materials, and land use policies.

In summary, the magnitude and character of growth during the 1984-90 period will contrast with that of the 1970s. This fact, combined with the recent 1981-82 recession, is forcing economic, social, political, and environmental adjustments in the region. Though resistance to change exists, as it does in most communities, important and tangible changes are occurring which will continue to make the Traverse City and northwest Michigan area a bright spot in Michigan in the 1980s.

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THE MICHIGAN ECONOMY

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New Medicare Regulations to Change Hospitals Significantly

by GEORGE A. NICHOLSON III, Certified Public Accountant and partner, Arthur Andersen and Co.

Newspaper headlines and magazine articles charge that health-care costs are out of control. Analysts warn that the Medicare trust fund will be depleted by the end of the 1980s. As a result, the government is moving to clamp down on spiraling health-care costs. Why is the Medicare system ailing? How is it being changed? What effects will the changes have on hospitals, physicians, and patients?

HISTORICAL PERSPECTIVES

In the early 1960s before Medicare began, health care costs were approximately 5 percent of the Gross National Product. Now they exceed 10 percent. Many factors have contributed to that increase, among them:

Expensive new life saving technologies, such as heart bypass surgery, kidney dialysis, neonatal care of premature babies, and cataract and lens procedures, which lead to kinds of care not previously possible,

The aging of the population, a trend which is significant because, on the average, people over 65 years of age account for three to four times as much hospital care as do younger patients, and

Inflation.

In addition, health insurance programs, such as Medicare, Medicaid, and often, Blue Cross, reimburse hospitals for the "reasonable cost of necessary care." As a result, after 1966 and the advent of Medicare, the health care industry significantly expanded its capacity and implemented costly new programs.

Belatedly, Medicare concluded that it could not afford the level of care that would be demanded in the future under the old cost-based payment systems. In response, the Health Care Financing Administration recently established hospital-specific prices for various illnesses. Now Medicare will reimburse hospitals according to preset prices for predefined Diagnosis Related Groups (DRGs), rather than according to the actual cost of the care.

There are 467 different DRGs, covering a wide range of illnesses and injuries. Over the next three years, na-

tional average rates for each DRG will be implemented, and substantially all hospitals receiving Medicare payments will be affected. The changes are intended to control Medicare costs. The government projects that, over the next three years, it will pay out \$12.5 billion fewer Medicare dollars than it would have paid had the previous system continued. Only increases in Medicare payments due to inflation will be allowed.

PHASING IN THE PROGRAM

How will the new payment system be implemented? In the first year of the new program, Medicare payments for each DRG will be based 75 percent on each hospital's historical costs for treating the ailment and 25 percent on national average costs. The next year, the payment will be based 50 percent on the hospital's cost and 50 percent on the federal average. After three years, hospitals will have to meet the federal rates 100 percent.

For example, suppose it now costs a Michigan hospital \$2,800 to treat a cataract-lens-procedure patient and the national average is \$2,500. The amount of reimbursement from Medicare to the hospital in 1984 would be 75 percent of \$2,800 (\$2,100) and 25 percent of the federal average of \$2,500 (\$625), bringing the total payment to \$2,725, or a reduction of \$75.

AFFECT ON HOSPITALS

The new regulations will force hospital administrators, physicians, and trustees to work as a team to manage effectively within the new resource limits. Medicare will no longer cover a hospital's actual costs for patient treatment. With the present per-case base, if the hospital is to treat Medicare patients profitably, it must treat them at a cost less than the payment.

Hospitals can decrease their costs by discharging patients into nursing homes if intensive hospital-level care is no longer needed, because nursing homes operate at significantly lower costs. Hospitals can also eliminate redundant tests or reduce patients' lengths of stay. Alternately, hospitals can cut their staffs.



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STEEL INDUSTRY UPDATE

by David I. Verway / page 3

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AFFECT ON PHYSICIANS

Under this reimbursement system, physicians will be asked to change some of their treatment patterns, since physicians' practice patterns will directly affect their hospital's profitability. Doctors will have to explore ways of controlling treatment costs, for example, by treating more people as outpatients or, as suggested above, by increasing the use of nursing homes as recovery locations for patients not requiring acute care. Hospitals are advising doctors of the costs of treating their patients and are suggesting ways to reduce expenses.

AFFECT ON PATIENTS

Patients admitted to hospitals should not notice a significant difference in care. Some hospitals may drop unprofitable services, while others will expand those areas in which they operate efficiently. The most probable changes expected will be shorter hospital stays, increased use of nursing homes as recovery centers, and more home health-care services.

AFFECT ON MICHIGAN HOSPITALS

For reimbursement purposes the United States has been divided into nine regions. Michigan has been placed in the East North Central region, in which the payments to hospitals will be based on the average costs of Michigan, Illinois, Indiana, Ohio, and Wisconsin hospitals.

The average cost per case for hospital services in this region is \$3,021.35, which is the highest of the nine regions. This means that the hospitals in Michigan now receive the highest Medicare per-case reimbursement. However, under the new regulations, when the system is phased in after three years, that average cost per case in Michigan will have to be cut to \$2,837.91 in order to meet the national average.

The new system obviously places hospitals at risk with regard to the effectiveness and efficiency with which they deliver health care. Several hospitals have reported cutbacks in their budgets due to the projected reductions in federal reimbursement and similar constraints. Most hospitals are also in the process of educating their doctors as to the cost of tests and medicines in order to elicit their help in holding down costs.

It is probable that hospitals will alter the services they offer in the future because of the new Medicare guidelines. They are, for example, beginning to specialize in the services which they perform most efficiently, thereby reducing profit-draining services. In addition, services such as emergency rooms or maternity wards may have to be closed if their average costs exceed the national rate or if their occupancy rates fall too low.

There are also problems in that the new system does not allow for case-by-case differences. A broken bone in the case of an elderly person is generally more complicated and expensive to treat than one in a teenager. Under the law as it is written now, Medicare would reimburse both a teenage and a sixty-seven-year-old patient at the same rate.

The majority of people in the health care profession don't think the changes will adversely affect patients. However, there are several potential problems that should not be taken lightly. For example, as hospitals cut back on the services they provide, access to care could become more limited. The change will also serve to limit the introduction of costly new technology and to reduce staffing levels. In the long run, it will be necessary to deliver the same quality of care at a lower cost without limiting patients' access to care. That is the challenge facing hospitals today.

WHO WILL BENEFIT?

It appears that everyone involved in the new Medicare program can benefit in the long run. Medicare was originally based on "reasonable cost for necessary care" with extensive regulations. Hospitals expanded, costs increased, and services grew. If one hospital started a new service, its competitors did the same. Costs were not challenged because they were recovered under Medicare and other similar programs. The industry tended toward first-class, premium-priced care. Under the changes, patients should receive medical treatment as good as or better than in the past for many reasons. First, the constant threat of malpractice proceedings will help keep hospitals and physicians from overlooking essential medical treatment simply because of the costs involved. Second, hospitals will begin to specialize in services they do well. Also, inefficient providers will be forced out of the system.

With hospitals closely reviewing their medical procedures, more services provided in less expensive non-critical care facilities, and taxpayers saving money through reduced government expenditures, the new system has great potential to control costs while improving the efficiency of the health-care delivery system. A similar system in New Jersey has been operating for three years with favorable results, but not without significant start-up difficulties. Similarly, governmental deregulation of the airlines industry in 1978 led to more cost-effective services, but not without great changes in many carriers and travel routes. Such changes were not without significant economic effects, many of which are still being felt today. However, if the new federal health-care system does what it is intended to, all should benefit in the long run.

Steel Industry Update

by DAVID I. VERWAY, director, Bureau of Business Research, School of Business Administration, Wayne State University

In 1864, the first Bessemer steel plant was built in this country at Wyandotte, Michigan. History books do not report the final disposition of that venture.

Among the integrated mills operating in Michigan today, the oldest, opened in 1920, is Rouge Steel in Dearborn, initially Ford's River Rouge Works. Great Lakes Steel in Ecorse began in 1923 as Michigan Steel Products. It incorporated in 1929 as Great Lakes Steel and then, almost immediately, joined the Hanna Company of Cleveland and Wierton Steel of Wierton, West Virginia, to form National Steel. The Great Lakes Division of National completed its mills in Ecorse and began producing steel in 1930. McLouth Steel, incorporated in 1934, has plants in Trenton and Gibraltar. Today, Rouge Steel is a wholly owned subsidiary of Ford Motor Company, National is in the process of being absorbed by United States Steel, and McLouth has been recently reorganized due to financial difficulties. So-called integrated steel mills produce iron by applying heat to a mixture of coke, iron ore, and limestone. Limestone serves as a flux to absorb impurities. From blast furnaces the iron goes to steel furnaces for further refinement. This product, in turn, is sent to finishing mills. These companies primarily produce sheet metal for bodies of motor vehicles.

In 1944 Rotary Electric Steel was incorporated to produce stainless steel in Warren. Those slabs were sent to mills in Detroit where they were hot rolled and sold to appliance, utensil, and other manufacturers for use in flatware, toasters, sinks, and other items where the appearance of the bare metal is important. Rotary Electric merged with Jones and Laughlin in 1957. In March 1983 the furnaces were shut down; stainless steel for J & L's Detroit mills now arrives from furnaces outside of Michigan.

Mac Steel, a division of Qualex Corporation, has made high-quality steel bars in Jackson since 1974. Its product finds applications in the automotive, oil exploration, and military hardware industries. North Star Steel has operated a plant in Monroe since 1981, also making high-quality bar steel as well as ordinary reinforcement bars for the automotive and construction industries.

Michigan's steel industry includes several other companies located in southeastern Michigan and other parts of the state; they have no capacity to produce raw steel. A number produce tubing and other items for use in the automotive industry and in other applications. Sheet for appliances also is rolled in steel mills located in Michigan.

America's steel industry first flourished in Pennsylvania and Ohio. The advent of low-cost oxygen for blast furnaces, beneficiating ore at the minehead, and technology change in the furnace itself has enabled the in-

dustry to produce more iron per ton of coke, iron ore, and limestone. Consequently, the importance of proximity to raw materials has diminished. The industry has spread from the traditional centers of Pittsburgh and Youngstown. In 1951, 6 of the nation's 251 blast furnaces were located in Michigan. By 1971, there were 9 in the state, although nationally the number had dropped to 219. Iron ores for the blast furnaces come from the Lake Superior district and Labrador, as well as other foreign sources. Michigan is the principal source of limestone for Detroit's furnaces. Coking coal comes from Appalachia. Ford and Great Lakes produce coke at their Michigan works.

Michigan steel pours from 8 basic oxygen furnaces (BOFs) and from 9 electric arc furnaces located in the southeast. Until the 1940s, Rough Steel and Great Lakes used open hearths, far less efficient than BOFs. McLouth's BOFs were installed during the 1950s to expand capacity. BOFs not only were more efficient in terms of tonnage per dollar on capital investment, but they also blew a considerably smaller volume of particulate into the atmosphere in the steelmaking process and were, therefore, favored by environmentalists. Electric furnaces, also clean, have the additional advantage of being able to absorb a wide range of ferrous scrap in making high-grade steel.

McLouth pioneered in the use of the oxygen process which enabled them to speed up the process of steelmaking. McLouth imported the new technology from Austria in 1954. McLouth also was first to experiment with continuous casting, in 1964. Rather than making steel ingots for rolling into slabs, blooms, or billets that are sent to hot-rolling mills, with continuous casting steelmakers these basic shapes are fashioned directly from liquid steel. Great Lakes also has a continuous caster and plans to install another. Rough Steel's caster will begin operating soon.

INDUSTRY STATISTICS

The flow of raw steel from Michigan furnaces more than doubled between 1951 and 1966, both years of high-level demand. Our state's contribution to the national total rose from 4.6 percent to 7.5 percent (see Table 1). Between 1966 and 1979 annual production fluctuated between 9 million and 11 million tons, and our share of the national total crept to 8 percent. Nationally and in Michigan, the all-time production record was set in 1973, at 151 million tons and 10.9 million tons respectively.

In 1979, Michigan almost surpassed the 1973 figure, whereas the national total was 10 percent below that peak. Between 1979 and 1982 the national total dropped by 45 percent and the Michigan by 44 percent. With last year's economic recovery, the Michigan steel industry posted a 19 percent gain in production, about double the national rate of 11.8 percent (see Table 1). In 1983 Michigan's share of the national total stood at 8.8 percent, an all-time record to date.

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Michigan Economic Indicators

Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	41.3	43.8	43.7 (Dec.)
Average weekly hours, U.S.	39.7	40.8	41.1 (Dec.)
Average hourly earnings, Michigan (\$) ..	11.29	11.92	12.02 (Dec.)
Average hourly earnings, U.S. (\$)	8.68	8.98	9.05 (Dec.)
U.S. motor vehicle production (units)	563,339	787,593	927,882 (Jan.)
Electricity usage (mil. kwh.):			
Michigan	5,379	6,478	6,082 (Sept.)
United States	178,296	207,695	201,581 (Sept.)
Raw steel production:			
Michigan (000 net tons)	560	609	562 (Nov.)
United States (000 net tons)	4,456	7,263	6,991 (Nov.)
Consumer price index (1967 = 100)			
Detroit area	292.6	300.1	300.3 (Jan.)
United States	293.1	303.4	305.2 (Jan.)
U.S. producer price index (1967 = 100)	299.9	306.0	308.1 (Jan.)
Michigan farm prices received index (1977 = 100)	117	138	141 (Jan.)

SOURCE: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Ward's Automotive Reports; American Iron and Steel Institute; and Energy Information Administration.

Permit Authorized Construction in Selected Counties, Final 1982 and Preliminary 1983

(Thousands of dollars)

County	Residential		Industrial		Office		Mercantile	
	1982	1983	1982	1983	1982	1983	1982	1983
Allegan	7,747	5,360	1,158	180	17	277	312	317
Antrim	5,701	8,594	110	350	0	0	1,106	0
Berrien	6,161	7,874	4,253	439	2,649	2,700	975	380
Clinton	4,838	7,529	13	117	0	275	360	357
Emmet	5,524	5,642	128	0	0	0	0	39
Genesee	14,234	26,543	1,710	4,116	3,957	8,190	5,348	6,981
Grand Traverse	10,601	19,637	497	489	753	768	1,676	832
Ingham	17,778	32,541	4,147	454	17,595	9,757	2,383	4,594
Jackson	9,931	5,270	188	181	571	306	460	214
Kalamazoo	16,497	29,228	26,004	3,453	3,212	3,908	3,314	3,041
Kent	47,585	86,037	46,704	12,330	19,469	8,676	4,847	7,029
Livingston	8,250	15,654	2,280	1,354	720	1,614	669	1,487
Macomb	624	93,291	7,946	36,993	4,017	7,351	5,596	14,415
Midland	8,177	16,755	99	405	729	482	127	476
Muskegon	8,035	8,351	5,271	548	177	478	312	815
Oakland	137,252	84,591	31,975	20,366	115,986	33,863	15,665	8,553
Ottawa	16,946	35,079	3,714	6,872	462	2,544	5,440	592
Saginaw	7,385	5,700	287	336	707	1,318	2,779	1,330
St. Clair	7,029	12,197	1,510	962	782	2,401	526	756
Washtenaw	18,875	29,247	3,807	7,436	7,042	14,950	1,938	1,789
Wayne	87,445	105,986	159,040	76,388	12,811	9,875	14,056	19,707
Michigan	593,229	987,760	3,122,432	205,733	121,037	204,222	71,299	107,150

SOURCE: Bureau of the Census, special release.

Number and Hourly Earnings of Automotive Workers: Selected Occupations

	April 1963		April 1969		December 1973		May 1983	
	Mich.	U.S.	Mich.	U.S.	Mich.	U.S.	Mich.	U.S.
MAINTENANCE								
Carpenters								
number	435	682	506	802	513	871	358	778
earnings in \$	3.36	3.35	4.63	4.62	6.46	6.46	13.50	13.50
Electricians								
number	3,300	6,038	3,582	7,079	3,907	8,581	5,041	10,704
earnings in \$	3.46	3.46	4.75	4.74	6.65	6.65	13.80	13.76
Machinists								
number	3,554	6,159	4,056	7,090	4,287	7,905	4,922	10,005
earnings in \$	3.50	3.50	4.78	4.79	6.64	6.65	13.81	13.78
Millwrights								
number	3,568	6,475	3,762	7,039	3,819	7,597	4,162	8,445
earnings in \$	3.39	3.38	4.64	4.64	6.48	6.48	13.58	13.51
Pipefitters								
number	2,025	3,846	2,266	4,701	2,448	5,441	3,022	6,579
earnings in \$	3.39	3.38	4.64	4.64	6.48	6.48	13.55	13.52
Sheet-metal workers								
number	738	1,247	783	1,427	833	1,606	888	1,952
earnings in \$	3.39	3.38	4.63	4.63	6.47	6.45	13.63	13.60
TOOLROOM								
Die makers								
number	148	239	102	201	53	142	48	82
earnings in \$	4.31	4.29	5.68	5.58	7.39	7.23	14.90	14.70
Machine tool operators								
number	2,344	3,853	2,128	3,564	1,950	3,552	3,137	6,230
earnings in \$	3.49	3.49	4.76	4.76	6.62	6.61	13.73	13.71
Patternmakers								
number	894	1,497	913	1,433	605	878	344	672
earnings in \$	4.11	4.09	5.44	5.44	7.40	7.40	14.83	14.79
Truckers								
number	7,809	13,876	9,236	17,181	9,255	17,440	7,674	17,685
earnings in \$	3.62	3.62	4.91	4.91	6.79	6.79	13.72	13.80
CUSTODIAL AND MATERIAL MOVEMENT								
Checkers								
number	2,936	5,590	3,679	6,554	3,225	5,964	1,845	3,685
earnings in \$	2.76	2.76	3.61	3.62	5.30	5.31	11.76	11.73
Janitors								
number	4,061	8,207	5,533	10,633	5,337	10,893	3,053	7,983
earnings in \$	2.52	2.52	3.37	3.37	5.00	5.00	11.23	11.20
Laborers								
number	3,361	8,028	3,786	7,229	4,306	8,660	1,525	4,121
earnings in \$	2.66	2.66	3.52	3.53	5.18	5.19	11.06	11.27
Truckdrivers (outside, semi)								
number	n.a.	n.a.	1,206	1,356	1,382	1,626	744	1,026
earnings in \$	n.a.	n.a.	3.91	3.91	6.12	6.11	12.24	12.29
Truckdrivers (outside, other than semi)								
number	n.a.	n.a.	609	1,011	414	699	256	515
earnings in \$	n.a.	n.a.	3.65	3.66	5.31	5.31	11.85	11.82
Truckdrivers (inside, gas and electric)								
number	n.a.	n.a.	10,386	18,663	11,732	21,924	7,143	14,259
earnings in \$	n.a.	n.a.	3.57	3.57	5.25	5.25	11.59	11.58
PRODUCTION								
Assemblers (line and bench)								
number	34,237	79,212	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
earnings in \$	2.73	2.74	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Assemblers (major)								
number	n.a.	n.a.	39,968	98,859	42,107	104,590	24,955	71,242
earnings in \$	n.a.	n.a.	3.62	3.62	5.29	5.29	11.57	11.61
Assemblers (minor)								
number	n.a.	n.a.	19,527	12,374	7,794	12,726	5,164	15,920
earnings in \$	n.a.	n.a.	3.52	3.53	5.22	5.21	11.68	11.49
Crib attendants								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1,291	2,414
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12.27	12.11
General foundry laborers								
number	n.a.	n.a.	4,829	3,137	1,856	3,024	1,101	2,448
earnings in \$	n.a.	n.a.	3.58	3.59	5.29	5.24	11.90	11.34
Heat treaters (furnace)								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	398	729
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.70	11.48
Controlmen								
number	n.a.	n.a.	304	520	209	424	141	269
earnings in \$	n.a.	n.a.	3.72	3.72	5.39	5.39	11.85	11.80
Load and unload								
number	n.a.	n.a.	732	2,075	686	1,261	257	460
earnings in \$	n.a.	n.a.	3.60	3.55	5.28	5.27	11.61	11.29
Inspectors (general production)								
number	12,627	24,211	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
earnings in \$	2.78	2.79	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

	April 1963		April 1969		December 1973		May 1983	
	Mich.	U.S.	Mich.	U.S.	Mich.	U.S.	Mich.	U.S.
PRODUCTION (cont.)								
Inspectors (final)								
number	n.a.	n.a.	4,172	10,404	5,054	12,161	n.a.	n.a.
earnings in \$	n.a.	n.a.	3.75	3.76	5.43	5.44	n.a.	n.a.
Inspectors (floor)								
number	n.a.	n.a.	3,920	6,809	4,422	7,885	n.a.	n.a.
earnings in \$	n.a.	n.a.	3.72	3.73	5.50	5.41	n.a.	n.a.
Inspectors (general)								
number	n.a.	n.a.	8,717	15,189	8,171	15,929	n.a.	n.a.
earnings in \$	n.a.	n.a.	3.61	3.61	5.32	5.32	n.a.	n.a.
Inspectors and checkers (production)								
number	n.a.	n.a.	2,325	3,470	1,834	2,932	1,348	2,578
earnings in \$	n.a.	n.a.	3.65	3.66	5.32	5.33	11.84	11.64
Inspectors								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10,788	24,964
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.77	11.79
Machine tool operators (production)								
number	16,736	29,511	18,728	30,315	15,971	28,447	8,029	17,787
earnings in \$	n.a.	n.a.	3.64	3.64	5.32	5.31	11.74	11.67
Bar stock screw-machine operators								
number	799	1,643	946	1,814	370	1,192	663	1,424
earnings in \$	2.95	2.92	3.88	3.87	5.57	5.54	12.21	12.12
Crankshaft grinders								
number	615	917	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
earnings in \$	2.85	2.86	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Other								
number	15,322	26,951	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
earnings in \$	2.76	2.76	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
General (except set-up men)								
number	n.a.	n.a.	10,115	17,825	8,904	17,490	4,175	10,511
earnings in \$	n.a.	n.a.	3.61	3.61	5.30	5.27	11.58	11.52
Special (except set-up men)								
number	n.a.	n.a.	7,667	10,676	6,697	9,765	3,221	5,852
earnings in \$	n.a.	n.a.	3.66	3.66	5.34	5.34	11.87	11.84
Metalfinishers								
number	1,504	4,130	1,977	4,538	1,517	3,413	421	985
earnings in \$	2.89	2.89	3.79	3.78	5.47	5.48	11.41	11.72
Molders (machine)								
number	397	570	378	568	305	602	n.a.	216
earnings in \$	2.89	2.89	3.79	3.79	5.50	5.50	n.a.	12.12
Punch-press operators (except set-up men)								
number	12,072	21,349	17,548	29,191	15,031	25,824	7,432	16,314
earnings in \$	2.75	2.76	3.63	3.62	5.33	5.33	11.42	11.70
Body stamping								
number	n.a.	n.a.	6,890	12,295	7,024	11,627	3,120	8,103
earnings in \$	n.a.	n.a.	3.68	3.69	5.37	5.36	11.13	11.62
General								
number	n.a.	n.a.	8,649	14,119	6,129	11,838	3,879	7,461
earnings in \$	n.a.	n.a.	3.58	3.57	5.28	5.29	11.61	11.78
Heavy								
number	n.a.	n.a.	2,009	2,777	1,878	2,359	433	750
earnings in \$	n.a.	n.a.	3.66	3.66	5.29	5.36	11.81	11.76
Sewing machine operators								
number	3,307	3,974	4,890	5,445	4,943	5,441	3,445	4,590
earnings in \$	2.67	2.66	3.56	3.55	5.28	5.28	11.57	11.64
Sprayers								
number	1,871	4,750	1,711	4,658	1,596	4,364	864	3,098
earnings in \$	2.87	2.87	3.79	3.78	5.48	5.46	11.72	11.76
Trimmers								
number	1,754	4,871	2,134	5,799	1,732	4,781	847	2,172
earnings in \$	2.86	2.84	3.72	3.72	5.40	5.41	11.61	11.72
Welders (hand)								
number	2,862	5,224	3,405	5,605	3,057	6,302	2,117	4,734
earnings in \$	2.88	2.88	3.78	3.78	5.48	5.46	11.79	11.98
Class A								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	288	871
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	13.84	13.60
Class B								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1,829	3,863
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.47	11.61
Welders (machine)								
number	6,309	15,451	9,715	22,348	9,520	22,032	5,079	13,352
earnings in \$	2.79	2.81	3.65	3.67	5.32	5.34	11.49	11.69
Plant operators (general)								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2,451
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.97
Polishing and buffing machine operators								
number	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	159	540
earnings in \$	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11.75	11.62

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, special release.

NOTE: Figures for 1963-73 pertain to American Motors, Chrysler, Ford, and General Motors. Volkswagen of America is included in the 1983 figures.

n.a. Not available.

Table 1
Production of Raw Steel in Michigan and the
United States: 1951-1983

Year	(000 short tons)		Michigan as percentage of United States
	Michigan	United States	
1951	4,829	105,200	4.6
1952	4,552	93,200	4.9
1953	5,142	111,482	4.6
1954	4,224	88,316	4.8
1955	5,999	116,858	5.1
1956	6,231	114,999	5.4
1957	6,220	112,630	5.5
1958	4,567	85,149	5.4
1959	5,634	95,361	6.0
1960	6,529 ^a	98,812	6.6
1961	6,644 ^a	97,417	6.8
1962	7,126 ^a	98,221	7.3
1963	8,447 ^a	109,011	7.7
1964	9,435	126,460	7.5
1965	8,990	131,237	6.9
1966	10,004	132,902	7.5
1967	9,247	126,323	7.3
1968	9,220	127,509	7.2
1969	10,039	141,008	7.1
1970	9,581	130,940	7.3
1971	9,069	120,443	7.5
1972	9,380	133,241	7.0
1973	10,945	150,799	7.3
1974	10,459	145,720	7.2
1975	9,093	116,642	7.8
1976	10,382	128,000	8.1
1977	10,051	125,333	8.0
1978	10,789	137,031	7.9
1979	10,922	136,341	8.0
1980	7,877	111,835	7.0
1981	8,943	120,828	7.4
1982	6,075	74,577	8.1
1983 ^b	7,230	83,379	8.7

SOURCE: Bureau of the Census, *Current Industrial Reports, Iron and Steel Foundries and Steel Ingot Production* (Washington, D.C.: 1933), M33A(82)-13, Table 7, and similar reports for previous years.

a. Includes Wisconsin.

b. Tonnage statistics released by the American Iron and Steel Institute.

The heavy Michigan emphasis on steel for the automotive industry is evident in the figures in Table 2. In this state, hot- and cold-rolled sheet and strip steel comprise about 90 percent of total shipments compared with less than half nationally. Hot-rolled sheet can be used for underbody and in other applications where a smooth, even finish is not required. Hot-rolled sheet is further processed through cold-rolling mills to produce a thinner gauge, smooth surfaced sheet for outer skin and for other uses where appearance is important. Although low in volume, Michigan also produces a relatively high proportion of cold-rolled bar and shape. Among other things, these products are made into steering-gear components and levers and arms that link various vehicle components. Michigan's basic steel industry typically employed 23,000 out of a national total of 550,000 during the periods of peak production of the 1960s. In the 1970s, 21,000 was the norm in this state, even though

Table 2
Shipments of Selected Steel Mill Products Including
Interplant Transfers, Michigan and the United States:
1971-1982

Year	(000 short tons)				Total ^b
	Hot-rolled sheet and strip ^a	Steel pipe and tube	Cold-rolled sheet and strip	Cold-rolled bar and shape	
1971 Michigan	n.a.	171	3,283	n.a.	8,750
United States	32,632	8,626	17,274	1,585	108,329
1972 Michigan	n.a.	224	3,439	n.a.	9,000
United States	36,564	8,708	18,080	1,907	114,498
1973 Michigan	5,566	279	3,896	n.p.	10,654
United States	42,758	10,616	22,719	2,373	136,965
1974 Michigan	5,724	247	3,289	n.a.	10,138
United States	41,382	11,790	20,938	2,503	137,786
1975 Michigan	4,828	241	2,386	141	8,110
United States	1,131	9,903	14,783	1,639	99,862
1976 Michigan	5,816	279	3,057	163	9,619
United States	37,602	7,915	20,265	1,739	112,257
1977 Michigan	5,603	229	2,944	165	9,343
United States	37,525	9,170	19,490	1,919	112,075
1978 Michigan	6,110	248	3,173	171	10,287
United States	38,903	10,400	19,734	2,112	120,890
1979 Michigan	n.a.	248	2,837	188	12,123
United States	39,484	10,547	19,529	2,284	124,074
1980 Michigan	n.a.	182	2,176	n.a.	7,817
United States	32,857	10,983	15,081	1,668	104,075
1981 Michigan	5,240	205	2,117	164	8,252
United States	34,779	12,765	16,657	1,806	109,761
1982 Michigan	3,726	162	1,462	89	5,693
United States	26,455	6,670	12,499	1,071	73,684

SOURCE: Bureau of the Census, *Current Industrial Reports, Steel Mill Products* (Washington, D.C., 1984), MA 33B(82)-1, Table 7, and similar reports for previous years.

a. Includes tin mill products.

b. Includes items not specified in other columns of this table.

n.a. Data not available.

more steel was poured. The national average during the 1970s fluctuated between 450,000 and 500,000. Today the Michigan industry provides around 15,000 jobs out of a national figure of 275,000; both of those totals can be expected to decline with productivity gains through automation and changes in work rules that allow more flexible use of labor.

In October 1983 hourly earnings averaged \$14.28 in this state's basic steel industry, about 9 percent above the national figure. Michigan's average exceeds the national average because of substantial overtime work in this state at premium rates. Between October 1982 and 1983 average hourly earnings declined by 10 percent here and 8 percent nationally, a result of labor's acceptance of pay cuts in order to prevent further erosion in employment levels.

THE INDUSTRY TODAY

Vehicle imports and downsizing have had an obvious effect on demand for basic steel from this country's mills. Not so evident is the condition of the industry compared with competitors in other countries. The U.S. industry is at risk because, while some mills in this country were falling behind, other countries, particularly newly developing countries with no steelmaking history, were investing in the most modern technology available. During the 1960s and much of the 1970s, American in-

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dustry became complacent; the major emphasis seemed to be on the production of large cars, houses, furniture, and appliances using the facilities of mass production created during the 1920s, 1930s, and 1940s. Robert B. Reich in his *The Next American Frontier* puts it as follows:

The industry was slow to innovate. By the late 1950s and early 1960s American steelmakers were balking at the chance to shift from open hearth furnaces, in which they had invested heavily after the war, to newer technologies: basic oxygen furnaces and continuous casting. No single firm needed to innovate because each knew that its competitors would not.¹

They simply ignored the foreign competition, lobbying Washington for import barriers as the pressure of foreign supply intensified.

The plight of the industry is greatest in Pennsylvania, Ohio, and West Virginia, locale of America's most antiquated mills. Michigan's steel industry is more modern, and where it is not is catching up. For example, McLouth, Great Lakes, and Rouge Steel are installing galvanizing facilities, vital in making rust-free cars. These days, the vehicle makers themselves are working more closely with industry to develop high-strength, low-weight components, new coatings, and so forth, so as to build lighter, more durable vehicles.

Michigan's steel industry pays pretty much the same level of wages as the national industry. The problem here is that the national norm for the steel industry is out of line with the national norm of all industry generally.

Using either the mid-1950s or the mid-1960s as a base period, the steel industry slipped in the ranking of industries by comparative advantage, a slippage which began two decades ago. Hourly compensation in steel tripled between 1964 and 1977-78, relative to a 2.5 fold increase in all manufacturers, attesting to the strong position of the USW union. Over the same period labor productivity in steel failed to keep pace with that in all manufactures. These two factors combined to push the unit labor cost index in iron and steel well above that of all manufacturing. In contrast, the Japanese iron and steel industry maintained its rank order among all Japanese manufacturing industries. The fact that in the late 1970s Japanese unit

labor cost iron and steel was around 50 to 60 percent of its American counterpart was due to gradual and prolonged slippage of the industry position in the United States and not to any unusual (exemplary or otherwise) performance in Japan.²

The situation is exacerbated by dumping—below cost pricing by government-owned mills in Korea, Brazil, and other developing countries.

Currently, six of the nine blast furnaces in this state are operating. At least one of the three idle furnaces is permanently closed. Several steelmaking furnaces also are either permanently or temporarily inactive. Some finishing mills have shut down; others are operating well-below capacity.

This year, Detroit Edison reduced its daytime electricity rates for industrial customers. Until then, daytime rates had been well-above evening and nighttime so as to encourage off-peak consumption of electricity by these users. At McLouth, for example, the plant operated evenings and nights on two shifts, with three Saturday and three Sunday shifts. Now the plant operates on a normal shift basis, adjusting to the market requirements. The net job result of the cut in daytime rates is the call-back of three hundred people that had been laid off.

The industry both here and nationally is not likely ever to exceed the tonnage peaks of the 1970s because of permanent reductions in demand as well as capacity to produce. Because of our increasing importance in the revitalizing North American vehicle industry, Michigan's share of activity in steel production has the potential of increasing. The reality will depend largely on productivity, meaning more production from fewer workers, both blue- and white-collar. Consequently, whether our share increases, stabilizes, or declines, the job outlook for basic steel in this state is rising production and further employment decline after the job-creating forces of the current recovery have spent themselves.

NOTES

1. Robert B. Reich, *The Next American Frontier* (New York: Times Books, 1983), p. 91.
2. Mordechai E. Kreinin, "United States' Competitive Advantage in Motor Vehicles and Steel," in Harvey E. Brazer, editor, *Michigan's Fiscal and Economic Structure* (Ann Arbor, Michigan: The University of Michigan Press, 1982), p. 168.



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Autopact Update

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Until 1965, the United States government levied tariffs of 6.5 percent ad valorem on imported new automobiles and 8.5 percent ad valorem on automobile parts manufactured outside of the country. The Canadian government, in addition to tariffs of 17.5 percent and 25 percent respectively on most vehicles and parts, employed a device known as content requirement of new motor vehicles produced in that country. Vehicle manufacturers whose product embodied a Commonwealth produced value of at least 60 percent were allowed to import certain components, ordinarily subject to tariffs, duty free. Meeting this 60 percent requirement also entitled a manufacturer to preferential tariff treatment in other Commonwealth countries, enhancing his export potential for vehicles produced in Canada. In other words, the content requirement was an inducement for motor vehicle manufacturers in Canada to manufacture or purchase parts locally.

Automobile trade conditions between Canada and the United States were altered radically in 1965. In return for promises of substantial production increases, automobile manufacturers in Canada were given the privilege of duty-free importation of motor vehicles and original parts from the United States. The elimination of United States tariffs, with respect to motor vehicles and original parts manufactured in Canada, gave Canadian producers free access to the American market. As a consequence of the elimination of trade barriers, traffic in these products between the two countries rose from a level of less than \$750 million in 1964 to better than \$6 billion during 1970. The 1983 figure was \$31.2 billion (see Table 1). This expansion enabled manufacturers to integrate their entire North American operation, rationalizing the production of vehicles and parts; the industry has achieved efficiencies in manufacturing that would not have been attainable under pre-1965 conditions.

PRE-1965 CONDITIONS

A salient characteristic of motor vehicle manufacturing is the relatively high level of operation necessary for attaining what is known as economies of scale. In the automobile industry economies of scale are achieved

Table 1
United States-Canada Trade in Automotive Products:
1964-1983

Year	Canadian imports (millions of U.S. dollars)			U.S. imports		
	Vehicles	Parts	Total	Vehicles	Parts	Total
1964	57	577	634	22	49	71
1965	142	738	880	88	139	227
1966	356	1,011	1,367	451	360	811
1967	665	1,216	1,882	920	474	1,394
1968	923	1,684	2,607	1,483	783	2,266
1969	976	2,134	3,110	2,097	959	3,056
1970	894	2,019	2,913	2,038	1,080	3,118
1971	1,319	2,448	3,767	2,511	1,481	3,992
1972	1,579	2,866	4,445	2,778	1,795	4,573
1973	2,082	3,552	5,634	3,061	2,172	5,233
1974	2,573	3,980	6,554	3,482	1,937	5,479
1975	3,064	4,409	7,472	3,726	2,008	5,734
1976	3,339	5,550	8,889	4,840	2,983	7,823
1977	3,712	6,434	10,146	5,636	3,496	9,132
1978	3,771	7,080	10,851	6,165	4,160	10,326
1979	4,801	7,344	12,145	5,685	3,831	9,715
1980	3,950	6,478	10,428	5,695	2,888	8,583
1981	4,218	7,700	11,918	6,917	3,462	10,379
1982	3,630	7,824	10,853	9,001	3,963	12,964
1983	4,856	9,735	14,591	10,877	5,724	16,601

SOURCE: U.S. Department of Commerce, special release

1. Canadian import statistics from the United States, based on FAS or transaction values, converted to U.S. dollars on the basis of then prevailing exchange rates.

2. U.S. imports from Canada are FAS or transaction values as published by the Bureau of the Census.

3. Preliminary.

when production reaches a level of 400,000 units annually.¹ This figure identifies that level of production which enables a producer to operate efficiently and achieve the necessary spreading of essential overhead costs. It is, in other words, the output at which unit costs of production are lowest. Beyond this minimum, it is generally believed that average unit costs are constant.

Automobile production in Canada is dominated by the Canadian subsidiaries or associates of the four companies which control the industry on this side of the



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border. In substance there is a North American automobile industry dominated by four giant corporations. They produce for a North American automobile market characterized by similar taste distributions on both sides of the Canadian-American border. The Swedish company, Volvo, also makes cars in Canada. GM, Ford, Chrysler, Mack, International Harvester, Kenworth, and Freightliner make trucks in both countries. Numerous other companies operate in one country or the other.

Superimposed on this structure until 1965 were the trade barriers mentioned at the outset of this article, which "protected" the Canadian industry from American competition by making it more profitable to produce in Canada for the relatively small Canadian market, rather than in the United States. While these trade barriers were largely responsible for the viability of a sizable Canadian automobile industry, they fostered inefficiencies in vehicle manufacturing. In one case, for example, a company produced "some 60 different models of five distinct passenger lines at its assembly plant in Canada, while 'just across the river on the U.S. side, Ford's great River Rouge assembly plant produces only three models of the Mustang line.'"² General Motors, Chrysler, and American Motors had similar situations. The inability to operate at the output level necessary for achieving economies of scale meant that automobile prices in Canada for the same makes of cars were substantially above those in this country. Another reflection of this condition was the wage rate differential between Canadian and American automobile workers. Canadian workers earned 20 to 25 percent less per hour than their counterparts in the United States, reflecting the productivity differential stemming from less efficient production.

The situation was particularly vexatious for Canada because, despite relatively high tariffs and the attendant sacrifice of production efficiencies, sizable amounts of parts and accessories were imported from the United States. At the time of the agreement, Canadians consumed about 7 percent of the total North American production of automobiles and parts, but their share of production was only about 4 percent. Their chronic trade deficit in automobiles accounted for nearly a third of their total trade deficit.

THE AGREEMENT

Known formally as the Agreement Concerning Automotive Products between the Government of the United States of America and the Government of Canada, the final accord grew out of a plan advanced by the author of the *Royal Commission on the Automotive Industry* (referred to generally as the Bladen Report).³ An earlier attempt to ameliorate the Canadian problem by means of an export rebate plan for Canadian producers led to the beginning of the negotiations in 1964 between the governments of the United States and Canada. These negotiations culminated in the agreement, signed in Johnson City, Texas, by the prime minister and the president on January 16, 1965. The agreement was ratified in the United States as part of the Automotive Products Trade Act of 1965, which became Public Law 89-283 on

October 21, 1965. In Canada the agreement was given effect immediately by means of an order in council.

The stated goals contained in the agreement are:

- (a) the creation of a broader market for automotive products within which the full benefits of specialization and large scale production can be achieved;
- (b) the liberalization of United States and Canadian automotive trade in respect to tariff barriers and other factors tending to impede it, with a view to enabling the industries of both countries to participate on a fair and equitable basis in the expanding total market of the two countries; and
- (c) the development of conditions in which market forces may operate effectively to attain the most economic pattern of investment, production, and trade.

The agreement pertains to the manufacture and sale of new automobiles and specified other motor vehicles (including most trucks and buses) and original parts for these vehicles. It does not apply to tires and tubes, except those already mounted on an assembled vehicle, or to replacement parts. Furthermore, only certain companies are permitted to import motor vehicles and parts duty free. In Canada, the initial, so-called qualified motor vehicle manufacturers were defined on the basis of their production records in the base year (August 1, 1963-July 31, 1964). In order to qualify, a producer had to maintain the dollar value of his production in the base year as well as his Canadian ratio of production to sales. More recent operators have made various arrangements with the Canadian government. At the latest count (December 1983) there were eighty-four firms listed as qualified manufacturers. Volkswagen qualified in 1984 by agreeing to make or purchase Canadian parts equal to at least 64 percent of the value of its duty-free vehicle imports. Independent parts producers must work through one of these qualified manufacturers in order to import duty-free parts for subassemblies or other reasons.

In the United States, the counterpart of these qualified manufacturers is the bona fide motor vehicle manufacturer. The agreement states that he is a manufacturer "who, upon application to the Secretary of Commerce, is determined to have produced no fewer than 15 complete motor vehicles in the United States during the previous 12 months, and to have installed capacity in the United States to produce 10 or more complete motor vehicles per 40-hour week." On December 31, 1983, there were 253 bona fide motor vehicle manufacturers.

To foreclose the possibility of third country producers establishing operations in Canada for the purpose of avoiding the tariff laws of the United States, the agreement provides for consultation between the two countries "with respect to the implications of the Agreement of new automotive producers becoming established in Canada." A North American content requirement written into the agreement affords additional protection against this

contingency. The agreement "permits either country or both countries to conclude similar agreements with third countries."

Important agreements were also made between the government of Canada and the four large automotive producers. These agreements, really commitments by the companies, were specified in letters of undertaking sent to the Canadian government in January 1965. The companies stipulated that they would increase the aggregate value of their Canadian output above that in the base year (1964 model year) by Canadian \$260 by the 1968 model year (ending July 31, 1968), as well as increase their output of vehicles and parts "by an amount equal to 60 percent of the growth in their market for automobiles sold for consumption in Canada and by an amount equal to 50 percent of the growth in their market for commercial vehicles sold for consumption in Canada." They also promised to at least sustain the ratios of their Canadian production to Canadian sales.

The elimination of content requirements on each vehicle produced in Canada along with tariff free trade between the two countries was intended to facilitate rationalization of North American motor vehicle production. It was envisaged that fewer models would be produced in Canadian plants, allowing vehicles to be produced more efficiently in longer production runs. These Canadian plants would supply some models for the Canadian market as well as elements of the American market. At the same time, models whose Canadian production had been suspended would be produced in the United States and sent to the Canadian market. Similar rationalization was anticipated for the production of parts for new vehicles.

The rationalization of vehicle manufacture on the Canadian side and the attainment of economies of scale would close the cost and price differential between cars sold in Canada and similar ones sold in the United States. In addition to ultimate price parity, framers of the agreement foresaw wage parity between Canadian automotive workers and their American counterparts as worker productivity rose with the attainment of scale economies.

With Canadian automobile consumption forecast to grow at the rate of 8 percent annually, it was felt that adjustments would be relatively painless for most automotive and parts producers in both countries, since the expansion in both countries would absorb any slack created by rationalization.

DEVELOPMENTS SINCE 1965

Washington was motivated by the realization that the Canadian situation was regarded as untenable in Ottawa and that the Canadians would go so far as to erect high trade barriers in order to correct it. The Johnson administration also seemed convinced that the benefits that would accrue to Canada by way of increased efficiency would not necessarily be harmful to the automotive workers on this side of the border.

For American labour the chief benefit of the Agreement was assurance of a continued growth in the market for exports to Canada, bringing with it the future need for additional workers to supply that

market. The rationalization of the industry would involve the transfer of the production of some models and parts to Canada, but any dislocations that arose would probably be minor, and over-all growth in job opportunities plus the adjustment assistance program would ease the burden.¹

An Automotive Adjustment Assistance Board was created to evaluate the merits of petitions for redress arising from readjustments engendered by Autopact. The board expired on June 30, 1968, considered the end of the transition period. During its life, the board entertained twenty-two petitions and issued fourteen certifications involving weekly allowances of around \$4.1 million to nearly two thousand workers in this country.

Response to the Autopact varied among the companies.

The Agreement enables American Motors to phase out assembly of the Ambassador and Javelin lines completely in Canada, while Canadian assembly of Redies and Ramblers was expanded. And when the new American Motors compact car, the Hornet, was brought out in 1969—at which time the Rambler line was discontinued—an interesting example of regional specialization in assembly was introduced. All sales of Hornets in eastern Canada and the eastern United States are supplied from American Motors' plant in Brampton, Ontario; sales in western regions are supplied from the plant in Kenosha, Wisconsin.

American Motors' Canadian assemblies rose by 33 percent between 1965 and 1968, whereas Canadian sales of their automobiles dropped by 30 percent. During 1973 American Motors, Brampton, shipped 62,200 cars across the border, compared with 16,410 from American Motors, Kenosha.²

Chrysler Corporation expanded production at its Windsor plant by 61 percent between 1965 and 1968, while "phasing out all Canadian assembly of the Chrysler and Valiant lines, concentrating on Canadian production of Polara and Monaco models of the Dodge line and on Plymouth Fury models."³

Ford Motor Company more than tripled its Canadian truck assemblies between 1965 and 1968 and increased output of passenger cars by 70 percent.

Before 1968 there has been an integration of car operations, with production of Comets and Fairlanes being completely phased out in Canada as of 1967. In 1968 and 1969, Ford began a program to achieve even greater integration in its car operations in North America. First, soon after its new St. Thomas, Ontario, plant went into operation in late 1967, Falcon production was shifted from there to the Oakville, Ontario, plant. Then, in March, 1969, the operations in the St. Thomas plant were shifted from Falcon to Maverick production. As in the case with American Motors' new compact Hornet, Ford achieved a degree of regional specialization in the North American pro-

Michigan Economic Indicators

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Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	41.1	43.8	44.0 (Jan.)
Average weekly hours, U.S.	39.2	41.2	40.5 (Jan.)
Average hourly earnings, Michigan (\$)	11.40	11.98	12.04 (Jan.)
Average hourly earnings, U.S. (\$)	8.71	9.06	9.09 (Jan.)
U.S. motor vehicle production (units)	663,279	927,882	955,635 (Feb.)
Electricity usage (mil. kwh.):			
Michigan	2,099	2,648	2,700 (Nov.)
United States	1,635	1,678	1,672 (Nov.)
Raw steel production:			
Michigan (000 net tons)	536	562	615 (Jan.)
United States (000 net tons)	5,570	6,991	7,970 (Jan.)
Consumer price index (1967 = 100)			
Detroit area	292.3	301.3	303.1 (Feb.)
United States	293.2	305.2	306.6 (Feb.)
U.S. producer price index (1967 = 100)			
Michigan farm prices received index (1977 = 100)	115	138	141 (Jan.)

SOURCE: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Ward's Automotive Reports; American Iron and Steel Institute; and Energy Information Administration.

Permit Authorized Construction in Selected Counties, First Two Months 1983-1984

(Thousands of dollars)

County	Residential		Industrial		Office		Mercantile	
	1983	1984	1983	1984	1983	1984	1983	1984
Allegan	50	570	0	0	0	0	0	0
Antrim	25	134	0	0	0	0	0	0
Berrien	196	505	0	0	0	98	55	0
Clinton	83	1,049	0	0	0	0	0	32
Emmet	32	580	0	0	0	0	0	0
Genesee	567	2,338	55	1,585	65	17	441	1,134
Grand Traverse	216	906	0	130	460	0	27	125
Ingham	731	3,949	0	150	325	0	75	1,605
Jackson	108	815	0	0	0	0	0	0
Kalamazoo	799	3,056	48	400	100	214	40	158
Kent	4,949	12,631	0	4,239	150	1,119	299	225
Livingston	281	1,433	0	705	0	0	0	0
Macomb	3,090	5,336	0	332	0	35	662	748
Midland	207	2,348	0	0	0	0	20	0
Muskegon	202	824	0	435	0	0	0	0
Oakland	8,501	27,190	243	2,841	11,800	39,791	350	1,936
Ottawa	1,562	3,786	0	8,085	0	0	115	482
Saginaw	241	394	0	0	0	0	0	292
St. Clair	240	625	0	100	829	210	0	0
Washtenaw	721	2,162	0	6,069	0	0	0	223
Wayne	2,800	14,502	0	11,248	0	3,860	550	2,381
MICHIGAN	29,770	97,858	4,717	36,863	13,809	46,197	3,212	10,559

SOURCE: Bureau of the Census, special release.

duction of the Maverick, with an estimated 70 percent of total requirements being supplied from Canada and the remainder being supplied from Ford's Kansas City plant. . . . General Motors Corporation appears to have relied much more heavily upon increased parts exports to meet its commitments than have any of the other producers. Production of cars and trucks has expanded faster than new registrations in Canada, but the increase has been much smaller than for Chrysler and Ford, both absolutely and, even more significantly, relative to the size of General Motors Canadian operations. Integration of car production is suggested however, by the fact that there has been a relative decline in Buick, Pontiac, and Oldsmobile operations in Canada, coupled with an expansion of Chevrolet assembly. In total, General Motors has reduced the number of car models produced in Canada to about one half the pre-agreement level.⁸

A number of important changes in parts sourcing also took place as a result of the Autopact. The Budd Company completed a new plant in Kitchener, Ontario, in 1967 to produce automotive frames, and Hayes Dana completed its Thorold, Ontario, frame plant in 1969. These new facilities were built at the behest of motor vehicle manufacturers, intent on increasing the Canadian content of their vehicles to satisfy the terms of letters of undertaking with the Canadian government. The Dana Corporation closed its Trenton, Michigan, plant in 1970, and Midland Ross closed its Maumee, Ohio, plant in 1971, because business failed to materialize as anticipated. Pontiac Motor Division also suspended its in-house framing operation, switching to A. O. Smith in Milwaukee in an Autopact unrelated development. Eaton Corporation, Rockwell Standard, Borg Warner, Federal Mogul, and a host of other automotive suppliers realigned their North American operations so as to be able to supply General Motors, Ford, Chrysler, American Motors, International Harvester, White Motor, Blue Bird Body, Thomas Build Buses, and others from Canadian plants. This enabled them to be in compliance with the Canadian content requirement. In some cases, Canadian content may be based on parts exports to this country, as, for example, in the case of Hendrickson, Canada, exporting heavy duty truck suspension components to Louisville, Kentucky, contributing to Ford of Canada's content requirement.

From almost nothing in 1964, trade in assembled automobiles rose to over 1.3 million units in 1973, declined during the slack 1974-1975 period, reached a new record of 1.4 million units in 1977, declined again to .97 million units in 1981, and totaled 1.28 million units last year. Trade in trucks and buses reached a new peak of nearly 550,000 in 1983 (Table 2).

In 1964 a 4-door sedan, 6-cylinder Plymouth Valiant carried a factory list price of \$2,137 in the United States. The price for the same car, similarly equipped, in Canada was \$2,342, 9.6 percent above the United States price. By 1968 prices for this model were \$2,337 and \$2,479

respectively; the differential had narrowed to 5.7 percent. The price differential for a 4-door, 8 cylinder Ford Custom narrowed from 9.2 percent to 5.9 percent, and for the Buick Riviera 2 door hardtop, 8 cylinder car, the price differential went from 30.4 percent to 8.7 percent during the four year span. The Buick Riviera, it might be pointed out, was not produced in Canada, which means that it was subject to the full tariff before the agreement.⁹

For the 1983 model year, the most recent for which price comparisons have been prepared by the United States Department of Commerce, "factory list prices at the time for introduction of selected 1983 models ranged from 8.2 to 15.5 percent lower in Canada than in the United States."¹⁰ Because of differences in taxation of vehicles, the retail price differences on comparable models are considerably less than factory list prices.

The dramatic turnabout in the price differential is due to productivity gains through rationalization of North American production and the resulting economies of scale, as well as the strong U.S. dollar against the Canadian dollar and cheaper Canadian labor. Currently, the Canadian dollar has an exchange value of less than 80 cents U.S. According to the most recent estimate, the base hourly cost of labor organized by the United Automobile Workers in Canada is about \$7 per hour U.S., below the comparable U.S. figure for UAW workers in the automotive industry. The difference between the \$16.35 hourly labor cost for Canadian UAW workers and \$23.48 for U.S. UAW workers as of December 1983 is a product of exchange rates as well as differences in fringe benefits.¹¹ In this country, health care insurance, for example, is paid by employers, whereas in Canada this is a government program, paid out of general taxes. Without fringe benefits, base hourly blue-collar pay in the automotive industry is about the same.

In 1965 6.7 percent of the North American made automobiles were sold in Canada. That share rose to 7.9 percent in 1978 and 8.6 percent last year. In sales of trucks, Canada's share went from 7.4 percent in 1965 to 8.5 percent in 1978, then dropped to 6.9 percent last year. In total motor vehicles, the Canadian shares were 6.5 percent (1965), 7.5 percent (1978), and 8.0 percent (1983). In unit vehicle production, Canada's share increased from 7.1 percent (1965) to 12.2 percent (1978) and 14.0 percent (1983). In parts production (valued in dollars), Canada had 3.2 percent of the North American total in 1965, 7.9 percent in 1978, and 8.1 percent in 1981, the most recent year for which these data are available.¹² Employment data suggest that Canada's share of parts production has increased since 1981.¹³

In other words, Canada has a surplus of production over consumption in the value of North American vehicle assembly. Trade in parts is reasonably balanced. In its trade with the U.S., Canada's surplus in finished vehicles was substantial. Its trade in parts was in substantial deficit simply because of the volume of U.S.-made parts that were imported, installed in cars, trucks, and buses, and sent back to the United States. Overall, Canada's trade surplus in automotive products exceeded \$2 billion in both 1982 and 1983, a figure that is likely to be ex-

Table 2
Factory Sales of Motor Vehicles from Canadian and U.S. Plants, by Canadian, U.S., and Other Destinations: 1964-1983

Year	(thousands of units)							
	Exports to Canada	Plants in United States Other exports	U.S. domestic	U.S. total	Exports to U.S.	Plants in Canada Other exports	Canada domestic	U.S.-Canada total
PASSENGER CARS								
1964	15	183	7,554	7,752	—	38	518	8,308
1965	47	159	9,121	9,326	34	40	631	10,031
1966	122	140	8,337	8,598	161	37	494	9,290
1967	246	120	7,070	7,437	326	35	355	8,153
1968	289	126	8,407	8,822	480	37	359	9,698
1969	285	131	7,806	8,224	677	36	315	9,251
1970	246	114	6,187	6,547	682	30	207	7,466
1971	352	111	8,122	8,585	780	38	258	9,660
1972	382	89	8,352	8,824	837	37	263	9,961
1973	476	103	9,079	9,658	862	41	323	10,884
1974	500	109	6,721	7,331	802	52	317	8,503
1975	549	90	6,073	6,713	713	58	272	7,756
1976	563	97	7,838	8,498	809	75	251	9,632
1977	586	103	8,512	9,201	832	87	237	10,357
1978	542	103	8,494	9,165	765	107	156	10,293
1979	582	159	7,678	8,419	582	93	298	9,392
1980	489	71	5,840	6,400	539	86	202	7,227
1981	455	51	5,749	6,255	516	102	154	7,027
1982	320	32	4,696	5,049	662	13	108	5,832
1983	505	33	6,201	6,739	773	19	153	7,685
TRUCKS AND BUSES								
1964	3	160	1,377	1,540	—	7	103	1,650
1965	10	126	1,616	1,752	7	16	119	1,893
1966	20	105	1,607	1,731	58	23	114	1,926
1967	35	90	1,414	1,539	98	27	101	1,765
1968	48	83	1,765	1,896	145	31	100	2,173
1969	60	82	1,781	1,923	198	30	87	2,238
1970	54	73	1,566	1,692	158	32	62	1,945
1971	69	70	1,914	2,053	166	30	83	2,332
1972	94	58	2,294	2,447	204	23	91	2,765
1973	120	72	1,787	2,980	215	27	113	3,335
1974	168	90	2,470	2,727	189	40	148	3,104
1975	134	136	2,003	2,272	181	48	161	2,662
1976	129	117	2,734	2,979	266	44	188	3,477
1977	135	127	3,179	3,442	348	47	211	4,047
1978	139	152	3,416	3,706	397	51	214	4,369
1979	158	137	2,741	3,037	348	44	241	3,670
1980	86	117	1,464	1,667	291	47	188	2,193
1981	89	98	1,513	1,700	304	59	152	2,215
1982	71	51	1,778	1,905	372	16	70	2,362
1983	106	47	2,260	2,414	442	10	93	2,959

SOURCE: Motor Vehicle Manufacturers Association of the United States, Inc., special release.

ceeded this year because of the greater popularity of vehicles produced there, along with plant closures in this country for conversion to new models and production methods.

For Michigan, the Autopact meant increased exports and imports of both vehicles and parts during the 1960s to the detriment of our parts sector. During the 1970s, Michigan made modest gains in the bargain with Canada in both motor vehicle assembly and parts. With the rationalization, much of the "headquarters" and research development activity in the previously semiautonomous Canadian industry also shifted to Michigan. So far during the 1980s, Autopact has worked to Michigan's detriment, a result, no doubt, of Canada's considerable advantage in labor costs but also due to the peculiarities

of model mix. A number of made-in-Michigan products are faring poorly in today's market with the result that this state's share of North American assembly dipped to about 26 percent in 1983 compared with 29 percent in 1982. Our share of parts production, as measured by employment, has been declining since 1978 (see Table 3).

PROSPECTS

As of May 1984, there are nine passenger car assembly plants operating in Michigan. This fall the Oldsmobile plant in Lansing will reopen to produce a new line of front-wheel-drive vehicles, and Chrysler will open its new Sterling Heights plant to produce its new "H" car. In 1985 Buick will convert its Flint plants for production of

Table 3
Shares of Employment of
North American Manufacturers: 1977-1983

Year	(percentage of total)		U.S.
	Michigan	Canada	
PARTS AND ACCESSORIES			
1977	45.7	5.3	94.4
1978	45.7	6.0	94.0
1979	45.0	5.9	94.1
1980	44.0	6.1	93.9
1981	42.1	6.7	93.3
1982	41.6	6.5	93.5
1983	37.7	7.2	92.8
VEHICLE ASSEMBLY			
1977	39.2	10.3	89.7
1978	39.7	9.8	90.2
1979	38.1	10.2	89.8
1980	40.8	11.1	88.9
1981	41.0	11.2	88.8
1982	41.0	12.7	87.3
1983	39.5	11.6	88.4

SOURCE: Developed from Michigan Employment Security Commission, special release; Bureau of Labor Statistics, *Employment and Earnings*, March 1984, Table B-2; Bureau of Labor Statistics, *Supplement to Employment and Earnings* (Washington, D.C., 1982); Statistics Canada, *Motor Vehicle Parts and Accessories Manufacturers 1982* (Ottawa, 1984), Catalogue 42-210; Statistics Canada, *Truck Body and Trailer Manufacturers 1982* (Ottawa, 1984); and Automotive Parts Manufacturers Association of Canada, *An Automotive-Led Recovery: Year-End Review of the North American Automotive Industry* (Toronto, 1984).

a new line of vehicles; the GM plant at Willow Run near Ypsilanti also will be converted. Sometime during 1986 the GM "Poletown" plant on the Detroit-Hamtramck border will come on-line. There is a good chance of car production by Toyo Kogyo (Mazda) in a now empty plant in Flat Rock and a remote possibility of Mitsubishi production somewhere in this state. Meanwhile, Ford's Dearborn assembly plant and GM's Detroit (Cadillac, Olds rear-drive 88) assembly plant are likely to close by the beginning of the 1987 model year. Michigan has five truck assembly plants (counting the GM Truck and Bus Manufacturing Division complex in Pontiac as one), a number that is unlikely to change in the foreseeable future. As things now stand, Michigan will have about 28 percent of Canada-U.S. vehicle assembly capacity, considerably more than any other state or province. Furthermore, because of a then favorable product mix, we probably will actually make somewhat more than 28 percent of the vehicles produced in our two countries.

To meet the Japanese challenge, Detroit also is implementing a new management technology that encompasses, among other phenomena, just-in-time manufacturing and statistical process control. Just-in-time manufacturing is a system of careful coordination and close monitoring so as to minimize the accumulation of materials and components between machines, stations, or factories in the production process. A leaner work-in-process inventory reduces the amount of loan required to finance it. Such loans, a part of so-called working capital, have become major costs in these days of high interest rates. This is especially true in the automotive industry, where manufacturers are accustomed to hedging against supply disruptions by stockpiling several

days' or even weeks' parts inventory. These large "floats" reflect a make-do mentality rather than "let's get it right," an attitude that evolved out of the need to meet ever expanding demand in the face of slowly rising capacity during the 1960s and early 1970s. In this helter-skelter of matching demand with supply, producers also relaxed their quality control on suppliers. Besides reducing carrying costs, the switch from "just-in-case" to just-in-time will give rise to earlier detection of flaws and better quality control inasmuch as defective parts will not accumulate.

Just-in-time vehicle production gives Michigan an advantage in parts manufacturing in that we have such a preponderance of North American assembly activity. The advantage arises because it is easier and cheaper, other things being equal, to ship in small lots on a just-in-time schedule, say twice daily, less than truck load, from Lapeer, Michigan, to Flint than it is from Arkansas to Flint. In other words, just-in-time manufacturing offsets some of Michigan's disadvantages, such as high workers' compensation and unemployment compensation costs compared with other states.

According to a partially completed survey of automotive suppliers in this state, the turnaround in fortune of the automotive industry has shifted the focus from "business climate" and cost issues to means of satisfying just-in-time scheduling of shipments to customers and the new quality standards set by GM, Ford, and Chrysler. The quality matter seems to be the one of most concern to smaller suppliers for two reasons. Many of them are trying to meet the new standards on equipment too worn or obsolete for the task. Second, they do not understand and are fearful of statistical process control.

Concerned for the viability of its supplier network, on which it will have to rely increasingly for assistance in research and development because of its own capital requirements for product and process development, the automotive industry, along with its major suppliers, has established the Automotive Industry Action Group. The AIAG has started several industry-wide productivity improvement programs:

- (1) development of industry-wide standards for customer/supplier electronic communications of material releases, shipment notification and invoices,
- (2) development of industry-wide standards for Bar Coding,
- (3) development of a program to define and promote the use of just-in-time manufacturing productivity techniques—including the documentation of successful North American applications,
- (4) development of an industry-wide company coding program,
- (5) establishment of a Schedule Stability Project Team to research the causes of schedule instability, identify and distribute information on individual company programs to overcome schedule instability, and develop recommendations for improvement;
- (6) development of a proposed returnable container "footprint" standard to reduce packaging costs, improve product protection and increase shipping cube utilization.

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Numerous companies throughout the industry have begun implementing the AIAG standards in advance of formal publication. As project team members investigate current systems, identify alternative approaches, and arrive at a consensus standard—and as companies begin implementing these standards—it has become evident that a significant educational effort will be required throughout the industry. This education will need to cover both existing systems and technology and the use of newly developed AIAG standards.

The AIAG has begun to work to (1) formally publish AIAG Standards for Electronic Communication of Material Releases and Bar Coding, (2) develop major conferences for just-in-time programs (including case studies), bar coding, and electronic communications, (3) develop and launch an AIAG Membership Program to expand industry participation, help fund future AIAG projects, and accelerate the implementation of AIAG programs, (4) identify and launch new industry-wide project team efforts after current projects are underway and sufficient resources are available to continue the step-by-step process of identifying and implementing industry-wide productivity improvement techniques.¹¹

The State of Michigan recognizes the importance of automotive suppliers and has designated them as a targeted industry in its industrial development program. This means that Lansing is focusing on reducing business costs for members of this industry as well as providing financial incentives and investment assistance. Michigan also is studying means of improving industry technology, helping companies to diversify markets, and providing training assistance in production management, particularly for just-in-time manufacturing and in statistical process control.

Meanwhile, Ontario has established its Centre for Automotive Parts Technology to assist in technology development and to provide marketing, manufacturing, and productivity services similar to those offered by the AIAG and being considered by the State of Michigan. In Ottawa, the federal government is considering measures that would widen Canada's cost advantage through tax and tariff changes, provide incentives for research and development, and extend the automotive agreement to all companies that sell vehicles in the Canadian market.

To the south, Mexico has new laws that will require GM, Ford, Chrysler, and others to expand their manufacturing operations there at the expense of activities on this side of the border. As a result of the challenge, not just from Canada and Mexico but from Japan and even-

tually Korea, Detroit has come alive. The excitement of meeting the quality challenge of the mid-1980s promises to surpass that of the early 1960s, when Michigan experienced a revitalization of its automotive industry in meeting the quantity challenge.

NOTES

1. Several good descriptions of the American automobile manufacturing process are available. See, for example, Charles E. Edwards, *Dynamics of the United States Automobile Industry*, (Columbia, South Carolina: 1965).
2. *Data Relating to H. R. 9042, Automotive Products Trade Act of 1965* (Washington, D.C.: 1965), p. 30.
3. (Ottawa: 1961). The Commission had only one member, V. W. Bladen.
4. Carl E. Beigie, *The Canada-U.S. Automotive Agreement: an Evaluation* (Washington, D.C., and Montreal, Quebec: Canadian-American Committee, 1970), p. 55.
5. *Ibid.*, pp. 61, 64, citing Edward Cowan, "Auto-Trade Pact Gets Tune-Up," *New York Times*, 12 November 1969, p. 50.
6. Cross border production statistics from Motor Vehicle Manufacturers Association of the United States, Inc. (formerly Automobile Manufacturers Association, Inc.), monthly statistical reports, FS-1 and FS-2.
7. Beigie, *Automotive Agreement*, p. 64.
8. *Ibid.*, pp. 64-66.
9. *Second Annual Report of the President to the Congress on the Operation of the Automotive Products Trade Act of 1965* (Washington, D.C.: 1968), pp. 40-42; and *Canadian Automobile Agreement Hearing before the Committee on Finance, United States Senate, Ninetieth Congress, Second Session, July 19, 1968* (Washington, D.C.: 1968), p. 15.
10. *Seventeenth Annual Report of the President to the Congress on the Operation of the Automotive Products Trade Act of 1965* (Washington, D.C.: 1984), p. 6.
11. Slawek Skorupinski, phone conversation with author, 26 April 1984.
12. *The Canadian Automotive Industry, Performance and Proposals for Progress: Inquiry into the Automotive Industry*, Simon Riesman, Commissioner (Ottawa: 1978), p. 86; and *An Automotive Strategy for Canada, Report of the Federal Task Force on the Canadian Motor Vehicle and Automotive Parts Industries to Honorable Edward C. Lumley, P.C., M.P., Minister of Trade and Commerce and Regional Economic Expansion* (Ottawa: 1983), p. 166.
13. Automotive Parts Manufacturers' Association of Canada, *An Automotive-Led Recovery: Year-End Review of the North American Automotive Industry* (Toronto: 1984), p. 2.
14. "AIAG Overview" (Mimeo, September 1983).



THE MICHIGAN ECONOMY

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What Is the Business Climate of Southeast Michigan?

by JOHN M. MATTILA, professor emeritus, Department of Economics, Wayne State University

Last year, in a review of fourteen different business climate studies, Michigan was ranked as having one of the worst business climates of the forty-eight contiguous states. [1] The review concluded that studies like the frequently quoted Alexander Grant study tend to over-emphasize labor costs and other employment factors. These factors tend to be lowest in those states and regions which are at the earliest stages of industrialization from a predominantly agricultural base, e.g., the Sun Belt. These states and regions compete for routine manufacturing operations which require only unskilled and semiskilled labor. But as these areas succeed in attracting more export industrial activity, which in turn stimulates the growth of the local service sector, and as both sectors compete for local labor, per capita and household incomes will rise. Growing income levels will lead to higher expectations for more public services—better schools and cultural facilities—which can only be provided with higher taxes. There is some scattered evidence that this "convergence" is already occurring in the Sun Belt.

This report compares two published business climate studies and suggests some alternative ways of measuring business climate, which may be more appropriate for a more mature industrial region such as Michigan, or more specifically, the southeast Michigan metropolitan region. The two studies that are examined in this paper are the 1983 Alexander Grant study of general manufacturing business climates and the 1983 *INC.* ranking of the states according to their small business climates. [2, 3]

THE ALEXANDER GRANT STUDIES

The 1982 and 1983 Alexander Grant studies are not equivalent, because some measurement factors were modified in the 1983 study: (1) state debt per capita was redefined to remove nonguaranteed debt which does not directly impact on future taxes; (2) union membership data, which is no longer collected by the federal government, was provided in a special study by a Rutgers University professor of industrial relations in 1983; and (3) the major change was in the workers' compensation insurance rate, which was previously reported as an absolute rate per \$100 of payroll based on National Council

on Compensation Insurance data. In 1983 a special study conducted by the Insurance Technical & Actuarial Consultant Corporation provided an average annual rate by state which was then converted into ratios of a state's weighted average workers' compensation rate, per \$100 of payroll, to the national average rate of \$2.77.

The basic methodology for deriving an aggregate score for each state remained the same between 1982 and 1983. The factor weights, which are provided by members of the Conference of State Manufacturers' Associations and change from year to year, are given in Table 1. Twelve of the twenty-two factors listed in Table 1 are directly labor related for a combined weight of 56.1 percent in 1982 and 54.6 percent in 1983. The weighting of taxes and changes in taxes were increased significantly, while the weights for wages, workers' compensation insurance (WCI) rates, and unemployment compensation (UC) benefits were reduced substantially between 1982 and 1983.

A correlation analysis of the contribution of each of the twenty factors to the state-by-state variation in the final rankings, ignoring the weights given in Table 1, indicates that the ten most significant factors in order of the size of their t-statistics are maximum WCI payment, change in wages, expenditure growth, taxes, manhours lost, high-school-educated adults, unionization, vocational education, WCI rate, and change in taxes. (A t-statistic is a measure of the degree of significance of correlation between two sets of numbers.) Five of the above ten factors are labor cost related, and five are government control factors (two are both labor and government control factors). When the state rankings are correlated, or regressed, against the twelve labor-related factors plus states with a right-to-work law, which was reported by the Alexander Grant study but not used in the final rankings, they explain 85 percent of the total variation in the final rankings. The right-to-work law is the statistically most significant variable. The five most significant labor variables—unionization, unemployment compensation benefits, maximum WCI rate, welfare expenditures, and right-to-work laws—explain 83 percent of the total variation in the final rankings. Work law is again the most significant



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statistical variable followed by the other government control factors—welfare expenditures, unemployment compensation benefits, and maximum WCI payment.

Table 1
Measurement Factors and Weights: 1982 and 1983
Grant Business Climate Studies

Factor	Weights (as percent)	
	1982	1983
Energy costs	8.76	8.12
Unionization	6.40	6.69
Taxes	4.98	6.66
Wages	8.08	6.61
Workers' compensation insurance rates	6.23	5.41
Manhours lost	4.83	5.01
Expenditure growth v. Revenue growth	4.10	4.78
Change in taxes	3.37	4.67
Value added	4.99	4.59
Unemployment compensation benefits	5.62	4.53
Maximum WCI payment	4.25	4.26
Change in wages	4.98	4.21
Debt	3.19	4.18
Unemployment compensation net worth	4.95	4.09
Vocational education enrollment	3.95	3.91
High school educated adults	3.85	3.89
Environmental control	3.84	3.89
Change in unionization	3.29	3.74
Population change	2.75	3.13
Welfare expenditures	2.24	3.01
Hours worked	2.46	2.45
Population density	2.91	2.17
	100.00	100.00

SOURCE: **The Fifth Study of General Manufacturing Business Climates**, Alexander Grant & Company, 1984.

We must therefore conclude that the Alexander Grant rankings are more strongly dominated by labor factors than appear from the Table 1 weighting of the factors. The statistical analysis also demonstrates that there is a great deal of unnecessary duplication and redundancy among these labor-related factors. It is important to note that four of the most significant labor factors—maximum WCI payments, UC benefits, WCI rates and right-to-work laws—are all government control factors which have been under serious review in Michigan and other industrial states. Regional economists, public finance experts, and business leaders all agree that labor costs are an important locational factor, but they are by no means the only, or even the most important, factor. For example, labor intensive, low wage, local service industries, which are primarily market oriented, do coexist with high paying export industries. The *INC.* small business climate study, which is analyzed next, gave labor a weighting of twenty out of a possible one hundred points and gave twenty-five points each to capital and state support. [3, p. 142]

THE INC. SMALL BUSINESS CLIMATE STUDY

INC. published a ranking of all fifty states according to their small business climates in 1981, 1982, and 1983. However, only the latter two are comparable, so our analysis will be confined primarily to the 1983 study. The rather brief description of their methodology is quoted in its entirety below:

INC. ranked the 50 states in these five categories—capital, labor, taxes, state support, and business activity. The overall scoring system was based on 100 possible points. The weighting for each category, moreover, was maintained according to last year's formula to reflect its relative importance to the majority of small, growing companies. Capital and state support were both given 25 points in the belief that they are the most critical factors. Taxes, while always an area of concern, received 10 points, the lowest weighting. Labor and business activity were each weighted at 20 points, in recognition of their significance to smaller businesses. According to this methodology, the total scores ranged from 76.0 for Texas to 39.5 for South Carolina. [3, p. 142]

The specific factors for which data are presented in the report include:

1. Capital resources, comprised of bank loans as a percent of assets, commercial and industrial loans per capita, SBIC financing per 1,000 population, and state loan programs.
2. Labor, including average weekly wage, percent unionized, percent high school graduates, and value added per worker (thousands of dollars per year).
3. Taxes per \$1,000 personal income.
4. State support for small business assistance programs.
5. Business activity, further subdivided to include percent of change in population from 1971-80, percent of gain in employment from 1971-80, percent of gain in personal income from 1971-80, business units per 1,000 population, and *INC.*'s one hundred companies from 1979-82.

Regressing the *INC.* ranking of the fifty states against all fifteen variables listed above and ignoring the *INC.* system of weights results in 87 percent of the total variation in ranks being explained by these variables. Only four variables are statistically significant—small business assistance programs, SBIC financing, bank loans, and change in personal income. When employment change, the fifth-most significant factor, is included in a reduced regression with the above four factors, they explain 83 percent of total variation in rankings. Small business assistance programs and SBIC financing are highly significant factors, with bank loans third, employment change fourth, and income change fifth in importance. Again, as in the analysis of the Alexander Grant study, we find a significant amount of duplication and redundancy of factors. This tends to obscure the relative contribution of the various factors to the final rankings of the states.

A simple correlation of the *INC.* rankings against a Sun Belt/Snow Belt variable resulted in a very unimpressive correlation coefficient of 0.07. However, when this Sun Belt variable is added to the regression with the five most significant *INC.* factors, the explained variation increases modestly from 83 to 85 percent, and Sun Belt is marginally significant with a t-score of 2.17.

This statistical analysis is consistent with the *INC.* assumptions regarding the relative importance of the various factors as reflected in their weights, in that the capital variables—state business assistance programs, SBIC financing, and bank loans—are the most important determinants of the rankings, but state support programs are of secondary importance, as are taxes, labor, and business activity. The *INC.* rankings are based on entirely different factors than the Alexander Grant ratings, and more important, the 1983 rankings of the business climates of the forty-eight contiguous states by the two studies bear very little resemblance to each other in that there is no significant correlation between them.

Is it really possible for state business climates to change dramatically in the middle of a severe recession? There were very surprising changes in the *INC.* rankings of some large, northern industrial states in the period 1982-83, with New York going from twelfth to fourth, Minnesota from nineteenth to fifth, and even Michigan improved from thirty-sixth in 1982 to twenty-eighth in 1983. A simple linear correlation of *INC.*'s 1983 rankings on its 1982 rankings results in significant but relatively low correlation. The Alexander Grant rankings were much more stable between these same two years. Michigan ranked forty-eighth in both years; Minnesota fell from thirty-second to forty-third position in 1983, while New York improved from forty-fifth to thirty-ninth position. One study professes to measure manufacturing business climate and the other small business climate. However, it is difficult to explain the diametrically different results with this relatively fine distinction.

One can only conclude that the difference in rankings is explained by the inclusion of different explanatory factors with significantly different weighting. The *INC.* study emphasized capital resources, and while it included labor costs and supply factors, these were weighted much less than in the Alexander Grant study. As our statistical analysis has shown, the Grant Study has labor costs completely dominating its final scores and rankings of the states.

This statistical analysis has confirmed our earlier findings that studies like the Alexander Grant report tend to overemphasize labor costs, which are important primarily for routine production processes that tend to locate in industrially underdeveloped regions. It is difficult to find fault with *INC.*'s heavy weighting of capital requirements for small businesses, but it is very questionable whether the quantum changes in rankings of states over a one-year period truly reflect fundamental structural changes in the states' political and economic climates which will translate to real changes in small business starts or growth.

MEASUREMENT FACTORS

The Alexander Grant study states that "the term

'business climates' as used in this report refers to a collection of twenty-two measurement factors viewed by manufacturers as important to their business success. The factors are oriented toward the cost of doing business and the availability of resources." [2, p. 1] Given this objective of their rankings, it would seem that a valid test of the success in development of a meaningful composite index of business climate would be to correlate the final rankings with a measure of employment growth by states.

When the *INC.* small business climate rankings were correlated with several alternative measures of state employment growth for the fifty states, the following results were obtained:

Percentage change in:	Correlation coefficient
Total employment, 1980-82	0.279
Total employment, 1980-83	0.292
Manufacturing employment, 1980-82	-0.038
Manufacturing employment, 1980-83	0.090
Nonmanufacturing employment, 1980-82	0.307
Nonmanufacturing employment, 1980-83	0.340

The *INC.* small business climate measure correlates somewhat better with changes in nonmanufacturing employment, but none of the coefficients are large enough to give much credence to their index. Also, there are complex leads and lags involved in regional employment growth which we have not attempted to identify.

Correlating the Alexander Grant manufacturing business climate rankings of the contiguous forty-eight states with the same six employment growth measures produced the following results:

Percentage change in:	Correlation coefficient
Total employment, 1980-82	-0.335
Total employment, 1980-83	-0.420
Manufacturing employment, 1980-82	-0.022
Manufacturing employment, 1980-83	-0.473
Nonmanufacturing employment, 1980-82	-0.254
Nonmanufacturing employment, 1980-83	-0.289

It is not surprising that these correlations are all negative, in sharp contrast to the *INC.* results, considering how little correlation there is between the *INC.* and Alexander Grant ranking of the states.

One major objection to both of these studies, as well as most other business climate studies, is that they use state-wide aggregates. As many critics of these studies have pointed out, states are not homogeneous economic regions, and it would be much more meaningful to develop business climate indexes at the metropolitan region level, since no one index will reflect the ideal business environment for all industries at a given location. The location requirements of food-processing plants are certainly different from research-and-development oriented, high-tech industries. Therefore, the concluding section of this paper outlines an alternative approach to business-climate analysis which would be more appropriate to a mature industrial center like the southeast Michigan region.

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Michigan Economic Indicators

Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	42.1	43.3	43.3 (May)
Average weekly hours, U.S.	39.9	40.7	40.7 (May)
Average hourly earnings, Michigan (\$) ..	11.50	12.41	12.09 (May)
Average hourly earnings, U.S. (\$)	8.77	9.09	9.11 (May)
U.S. motor vehicle production (units)	804,252	933,628	1,006,496 (May)
Electricity usage (mil. kwh.):			
Michigan	5,319	6,273	5,946 (Feb.)
United States	173,465	206,948	188,857 (Feb.)
Raw steel production:			
Michigan (000 net tons)	659	741	739 (May)
United States (000 net tons)	7,412	8,997	9,174 (May)
Consumer price index (1967 = 100)			
Detroit area	294.9	305.6	305.7 (May)
United States	297.1	308.8	309.7 (May)
U.S. producer price index (1967 = 100) ...	301.5	311.4	311.7 (May)
Michigan farm prices received index (1977 = 100)	121	140	140 (June)

SOURCE: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Ward's Automotive Reports; American Iron and Steel Institute; and Energy Information Administration.

Permit Authorized Construction in Selected Counties, First Four Months 1983-1984

(Thousands of dollars)

County	Residential		Industrial		Office		Mercantile	
	1983	1984	1983	1984	1983	1984	1983	1984
Allegan	884	2,104	33	10	0	0	0	0
Antrim	1,287	1,371	0	0	0	0	0	0
Berrien	1,456	2,110	0	48	0	802	77	42
Clinton	1,701	2,867	0	0	0	0	175	53
Emmet	1,074	1,138	0	0	0	0	0	68
Genesee	3,462	6,122	577	1,885	2,395	853	1,235	6,246
Grand Traverse	3,515	3,440	32	302	625	270	250	772
Ingham	7,711	10,681	20	547	325	7,515	498	2,094
Jackson	647	1,823	0	0	0	7	51	245
Kalamazoo	4,851	6,953	472	950	100	879	286	316
Kent	24,500	34,029	463	8,140	450	1,735	943	3,144
Livingston	3,275	5,541	0	828	0	0	138	200
Macomb	19,852	31,221	1,465	3,364	150	1,247	2,582	3,928
Midland	3,964	6,137	0	208	0	500	23	0
Muskegon	1,750	2,937	35	435	358	0	555	310
Oakland	50,904	95,327	1,919	37,881	22,972	56,558	2,095	7,497
Ottawa	10,744	12,452	200	8,785	165	144	4,698	1,524
Saginaw	690	2,037	150	0	0	0	799	337
St. Clair	2,256	2,590	21	478	1,164	344	92	69
Washtenaw	6,956	7,859	5,540	6,095	9,278	3,800	64	223
Wayne	18,353	35,654	11,645	23,277	156	5,278	3,306	7,622
Michigan	209,154	327,153	30,683	96,851	40,866	81,246	28,609	37,838

SOURCE: Bureau of the Census, special release.

Quarterly Personal Income in Michigan

Millions of dollars, annual rates, seasonally adjusted									Percentage change	
1982			1983				1984		83(4) to	84(1)
2	3	4	1	2	3	4	1		Michigan	United States

TOTAL LABOR AND PROPRIETORS' INCOME BY PLACE OF WORK

BY TYPE

Wage and salary disbursements	60,009	60,396	58,929	60,668	62,303	62,927	64,262	67,054	4.3	2.3
Other labor income	7,768	7,885	7,603	8,056	8,318	8,566	8,978	9,542	6.3	3.4
Proprietors' income	3,535	3,498	3,899	4,128	4,327	4,382	4,532	5,246	15.8	18.8
Farm	355	311	606	532	466	346	404	803	98.8	91.8
Nonfarm	3,180	3,186	3,293	3,596	3,860	4,036	4,128	4,443	7.6	5.8

BY INDUSTRY

Farm	625	597	901	832	771	657	721	1,126	56.2	55.5
Nonfarm	70,687	71,182	69,534	72,021	74,176	75,218	77,051	80,716	4.8	2.6
Private	60,461	61,110	58,957	61,804	63,381	64,143	66,360	69,788	5.2	2.7
Ag. Serv., For., Fish., and other	166	168	171	186	182	185	185	194	4.9	5.2
Mining	326	283	282	317	298	332	339	337	-0.6	1.5
Construction	2,644	2,570	2,597	2,709	2,709	2,776	2,646	2,910	10.0	3.5
Manufacturing	27,830	27,920	25,701	27,685	28,471	29,542	31,120	33,247	6.8	3.5
Nondurable goods	4,893	4,938	4,859	5,074	5,221	5,154	5,357	5,624	5.0	2.1
Durable goods	22,937	22,983	20,842	22,611	23,250	24,388	25,763	27,623	7.2	4.3
Transportation and public utilities	4,312	4,306	4,254	4,444	4,371	3,999	4,126	4,250	3.0	1.1
Wholesale trade	3,892	3,954	3,904	3,965	4,207	4,261	4,386	4,602	4.9	2.5
Retail trade	6,295	6,374	6,382	6,499	6,669	6,576	6,631	6,839	3.1	1.9
Finance, insurance, and real estate	3,055	3,152	3,179	3,194	3,320	3,276	3,346	3,481	4.0	2.1
Services	11,943	12,384	12,486	12,805	13,153	13,196	13,581	13,928	2.6	2.5
Government and government enterprise	10,226	10,072	10,577	10,217	10,795	11,076	10,691	10,928	2.2	2.1
Federal, civilian	1,326	1,351	1,357	1,355	1,381	1,376	1,371	1,383	0.9	2.1
Federal, military	259	261	270	276	280	274	274	281	2.6	3.9
State and local	8,641	8,461	8,950	8,586	9,135	9,425	9,047	9,263	2.4	1.9

DERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENCE

Total labor and proprietors' income by place of work	71,313	71,779	70,435	72,852	74,947	75,875	77,772	81,842	5.2	3.5
Less: Personal contributions for social insurance by place of work	3,902	3,919	3,811	4,041	4,097	4,099	4,204	4,523	7.6	5.1
Plus: Residence adjustment	494	493	494	489	504	532	549	555	1.1	2.6
Net labor and proprietors' income by place of residence	67,905	68,352	67,118	69,301	71,354	72,308	74,117	77,874	5.1	3.4
Plus: Dividends, interest, and rent	16,457	16,342	16,430	16,267	16,289	16,801	17,262	17,861	3.5	3.5
Plus: Transfer payments	15,341	15,752	17,198	16,742	16,875	16,209	16,327	16,471	0.9	0.9
State U.I. benefits	1,860	1,731	2,738	2,166	2,058	1,221	1,076	919	-14.6	-16.0
Transfers excluding state U.I.	13,481	14,021	14,460	14,576	14,817	14,988	15,251	15,552	2.0	1.8
Personal income by place of residence	99,703	100,446	100,746	102,309	104,518	105,318	107,707	112,206	4.2	3.0

SOURCE: Bureau of Economic Analysis, special release.

AN ALTERNATIVE APPROACH

Wilbur R. Thompson, economics professor emeritus, Wayne State University, has made significant progress toward developing a set of alternative indexes to evaluate the local economies of the Detroit-Ann Arbor standard consolidated area and the Cleveland-Akron-Lorain-Elyria standard consolidated area. [4, 5] He has selected variables which are relevant to the evaluation of the competitive position of large metropolitan areas along five distinct development tracks:

- Routine production, which ranges across manufacturing, trade, and services;
- Precision production, or industries which use more craftsmen and technicians;
- Research and development, thereby acting as a center of science and technology;
- Central administration, distinguishing between industrial and nonindustrial headquarters functions; and
- Entrepreneurship, or the local propensity to start new businesses of any kind.

Thompson's main focus to date has been on various indicators of strength and weakness in science and technology. He has ranked Detroit and Cleveland among the thirty-two largest metropolitan regions (standard consolidated areas as defined by the various censuses), based on the following criteria:

Criteria	Detroit ranking
All scientists and engineers, 1980	8
Doctoral scientists and engineers	
Total number, 1975	8
Per 100,000 population	20
Earned doctorates granted by local universities, 1975-80	
Total number, all fields	5
Per 100,000 population	12
All sciences and engineering	7
Per 100,000 population	9
Percent of population 25 years and over with 4 or more years of college, 1980	30

In regard to southeast Michigan's prospects as a vigorous center of science and technology, Thompson concludes that the region displays a much stronger position in engineering than in basic sciences and is particularly strong in mechanical and industrial engineering. In very general terms, the Detroit-Ann Arbor consolidated metropolitan area ranks above average in the physical sciences, below average in the biological sciences, and stands above average in the medical sciences. This holds true for both practicing scientists and engineers and in earned doctorates granted by local universities (which were used as a proxy for the quantity and quality of easily accessible laboratory facilities and academic consultants).

It is not possible to review all of the innovative indexes that Thompson has defined and quantified for these thirty-two major industrial centers, but one more example will suggest the breadth and depth of the types of factors that should be included in a comprehensive

evaluation of a region's business climate. To assess the Detroit region's potential as a major central administration and management (headquarters) center, Thompson has used such variables as:

	Detroit ranking
Employment in manufacturing central administrative offices and auxiliaries, 1977	
Total number	2
Percent of total employment	1
Total employment of Fortune 500 firms with local headquarters, 1982	
Total number	2
Per 100,000 population	2
Minorities employed in administrative, executive and managerial occupations, 1980 (percent)	
Females	25
Blacks	17
Total airplane departures, 1981 (thousands)	30
Ratio of central-city share of selected services to central-city share of metropolitan population	20 of only 20 of the 32 centers

From this potential development track, Thompson concludes that southeast Michigan displays surprising strength in central administration and management, especially in manufacturing, but has much further to go in drawing on the full range of talent available in the region. This region ranks very low in female and black employment in administrative, executive and managerial positions.

The author has made extensive use of the 1980 U.S. Census of Population Microdata Files to study the occupational characteristics of the labor force in this region. The census data confirm our hypothesis that a stable or declining blue-collar labor force would result in a significant aging of the workers. For example, the percent of tool and die makers aged fifty-five and over increased from 18.3 percent in 1970 to 33.9 percent in 1980. This means that large numbers of these skilled, blue-collar workers will retire or die in the near future, but it also means that there will be a large replacement demand for workers in skill groups, presenting a challenge to the region's educational institutions and training facilities to provide these skilled workers.

Although this article has only begun to identify some of the many dimensions of a region's complex business climate, this alternative approach of using multiple indexes and homogeneous metropolitan areas seems far superior than studies that focus on heterogeneous states. Analysts should consider not only quantifiable noneconomic factors but also qualitative factors, such as cultural amenities and public services offered. The recently published *Places Rated Almanac*, while not a business climate study, does attempt to develop an index of the quality of life for 277 of the largest metropolitan areas in the United States. [6]

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Brief

Michigan manufacturers spent \$1.6 billion on research and development (R & D) during 1979 according to the most recent tabulations by the National Science Foundation. That figure represented 9.5 percent of the \$38 billion national total. By way of comparison, Michigan contains about 4 percent of the nation's population, and in a typical year approximately 6 percent of manufacturing activity takes place here.

The federal government sponsored nearly a third of the nation's industrial R & D; most government sponsored R & D is devoted to missiles, aircraft, and other military applications. Michigan accounted for approximately 1 percent of federally funded R & D. Of the remainder, the \$25.5 billion in company funded R & D, \$3.4 billion or over 13 percent was spent in the Wolverine State.

Basic research, defined as scientific investigation conducted primarily for enlarging the fund of human knowledge, represented \$1.1 billion or 3 percent of the national R & D total; \$7.2 billion (19 percent) was spent on applied research, that undertaken with a specific commercial objective. The bulk of R & D spending goes for development, i.e., technical activities concerned with translating knowledge into products or processes, but does not include product testing, marketing research, and other activities downstream from the laboratory.

The five largest industrial categories of national R & D, accounting for 78 percent of the 1979 total, are: aircraft and missiles, \$8,454 million; electrical equipment and electronics, \$7,646 million; machinery, \$5,126 million; motor vehicles, \$4,429 million; and chemicals (including pharmaceuticals), \$4,035 million. The division of R & D by industry is not available for states. Patent statistics, which can be analyzed on a state-by-state basis, show that during 1980 ten companies were granted twenty or more patents with a Michigan origin.

Company	Number of patents	
	Michigan	United States
General Motors	188	326
Upjohn	148	170
Dow	144	256
Ford Motor	133	145
BASF	47	56
Bendix	43	131
Eaton	42	104
Dow Corning	26	31
Chrysler	23	25
Ethyl	23	50

These companies accounted for 817 or 38 percent of the 2,167 patents granted in Michigan and 63 percent of the U.S. patents granted to those companies. These figures, along with tabulations of patents classified on a product basis, suggest that 25-30 percent of the patents granted in Michigan are related to motor vehicles, 20-25 percent to pharmaceuticals and other chemicals, and 15-20 percent to machinery, including materials handling equipment. Michigan is weak in R & D in the fields of aircraft, electronics, petroleum, rubber, textiles, apparel, food, tobacco, and stone, clay and glass products.

In total patents Michigan had 5.5 percent of the national total during 1979 a figure well below our nine and one-half percent of R & D. On the theory that research is more likely to have a patentable result than is development this difference suggests that emphasis on development is even more pronounced here than nationally. Michigan's greater concentration on development also is borne out in recently released employment figures for the high-technology occupations. In 1980, the date of the latest Census of Population, 4.4 percent of the nation's engineers and 4.0 percent of the nation's engineer-

TABLE 1: Research and Development and Patent Activity in Michigan: 1963-1981

Year	Research and development spending				Patents	
	Federal funds		Company funds		number	percent-age
	(\$000,000)	percent-age	(\$000,000)	percent-age		
1963	65	.9	797	14.9	2,347	6.3
1964	65	.9	835	14.5	2,433	6.3
1965	64	.8	895	14.6	3,135	6.2
1966	98	1.2	977	13.5	3,675	6.4
1967	115	1.4	952	11.9	3,306	6.1
1968	98	1.1	1,086	12.2	2,968	6.1
1969	83	1.0	1,228	12.5	3,160	5.9
1970	77	1.0	1,171	11.6	2,831	5.7
1971	78	1.0	1,338	12.6	3,386	5.8
1972	86	1.1	1,500	13.2	3,156	5.8
1973	56	.7	1,832	14.4	3,091	5.7
1974	78	.9	1,990	14.2	3,215	5.6
1975	114	1.3	1,858	12.6	2,832	5.7
1976	124	1.3	2,248	12.9	2,961	5.2
1977	144	1.4	2,614	13.5	2,474	5.2
1978	n.a.	n.a.	n.a.	n.a.	2,373	5.3
1979	150	1.2	3,439	13.5	1,875	5.5
1980	n.a.	n.a.	n.a.	n.a.	2,130	5.6
1981	n.a.	n.a.	n.a.	n.a.	2,457	5.7

SOURCE: Developed from National Science Foundation and Commissioner of Patents and Trademarks data.
n.a.: not available.

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ing and science technicians were employed in Michigan, compared with only 3 percent of the computer specialists and 2.9 percent of the scientists. That these proportions of engineering and science personnel are well below our proportion of R & D points to another Michigan phenomenon: a very high volume of R & D activity per person so employed, suggesting a high concentration of R & D among relatively few companies.

In summary, Michigan R & D is concentrated in the broad categories of metals technology and chemicals, focuses heavily on development as opposed to research, and is dominated by big, not small, business.

TABLE 2: Michigan Experienced Labor Force in High-Technology Occupations: 1970 and 1980

Occupation	Number		Percentage of U.S.	
	1970	1980	1970	1980
Engineers	55,089	65,048	4.4	4.4
Engineering and science technicians	39,309	45,670	4.7	4.0
Computer specialists	9,463	17,748	3.6	3.0
Scientists	6,908	9,061	3.3	2.9
Mathematicians	1,010	1,304	2.8	n.a.

SOURCE: Developed from Census of Population and Current Population Survey.
 n.a.: not available.

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